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Administrative Science/
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UNIVERSITY-INDUSTRY-GOVERNMENT INTERACTIONS IN RUSSIAN INNOVATION POLICIES

European Master in Higher Education (HEEM), a joint program provided by the University of Oslo (Norway), Tampere University (Finland) and University of Aveiro (Portugal)

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Innovation has been stated as Russia’s national priority and an impetus to county’s economic growth. As a part of national innovation system (NIS) advancement, University-Industry-Government (UIG) relations are now seen extremely crucial. Over the last decade, the Russian state has placed the issue of fostering UIG interaction in focus. As a result, it entailed launching a variety of governmental programs and infrastructural projects.

The aim of the present research is to explore how UIG relations are addressed by innovation policies and what are the main obstacles to their development in Russia. In order to accomplish this aim, the Triple Helix (TH) model was applied as a conceptual framework. Methodologically the study relies on qualitative approach and is conducted in the form of policy analysis. The issue of UIG interaction in Russian innovation policy has been explored through six dimensions: policy problem, policy objective, policy instrument, policy linkage, policy evaluation, policy challenges. Data collection included extensive document review, secondary reports examination and several in-depth interviews.

The findings of the study reveal that despite the fact that Russian state recognizes the importance of UIG linkages and attempts to support them, there is still a considerable lagging behind to compare with western countries. One of the Russian particularities is that initiatives on innovative development are predominantly top-down. Given the number of governmental actions to stimulate innovations and interface within NIS, results can be characterized as very modest so far. State’s approach towards UIG interaction advancement lacks consistency and integrity as well as sound evaluation and monitoring system. Furthermore, the absence of a nation-wide innovation law creates additional barriers. Nevertheless, over the last decade positive dynamics in UIG interface development can be observed. New institutional forms are being established together with the legislation modification. In the modern era of rapid transformations there is a chance that Russia will overcome current obstacles and be successfully integrated into global innovation system.
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Ekaterina Chaykina
St. Petersburg, 2012
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ABBRIVIATIONS

BRICS – Brazil, Russia, India, China and South Africa
CIS – Commonwealth of Independent States
e.g. – *Exempli gratia*, for example
etc. – *Et cetera*, and so forth
FZ – *Federálniy zakon*, Federal Decree
GDP – Gross domestic product
HEI – Higher Educational Institution
ibid – *ibidem*, the same place
ICT – Information and Communication Technology
NIS – National Innovation System
NGO – Non-governmental organization
OECD – Organization of Economic Cooperation and Development
Ph.D. – Doctor of Philosophy
R&D – Research and Development
RAS – Russian Academy of Science
RF – Russian Federation
RUSNANO – Russian Corporation of Nanotechnologies
RVC – Russian Venture Company
S&T – Science and Technology
SEZ – Special Economic Zones
SME – Small and Middle-Sized Enterprises
SWOT – Strengths-Weakness-Opportunities-Treats (analysis)
TH – Triple Helix (model)
TUSUR – Tomsk State University of Control Systems and Radioelectronics
U.S. – United States of America
U-I – University-Industry (relations)
UIG – University-Industry-Government (interaction)
UK – United Kingdom of Great Britain and Northern Ireland
USA – United States of America
USD – United States dollar
USSR – Union of Soviet Socialist Republics
VAT – Value added tax
1 INTRODUCTION

1.1 Background of the topic and rationale

The role of technology and innovation in human history is reasonably regarded as crucial. According to predominant discourse, innovation fosters effective and sustainable economic and social development and is a key element for a country to be globally competitive. Innovation itself has not appeared at the present time. Indeed, it originates from first human attempts to generate new ideas, apply them and, as a result, invent something that has never existed before. In addition, Sagasti (2004) sees innovation as a mean of transforming society and its values. However, scientific interest to innovation and its commercialization has significantly grown only recently. Moreover, specific research on how it influences economies around the world has soared during several last decades (Fegerberg, 2006). In times of world economic crisis and increased environmental pressures, innovation and its promotion receives an exceptional attention and is seen as the way to overcome various hurdles.

Nowadays innovation cannot be an individual effort anymore as it involves many actors. They interconnect, interact and change over time. It creates a team that is driven to foster innovation as a common goal (Juma et al, 2005). Subsequently, these interactions can be described as an important element of development in so-called knowledge-based economy when knowledge and its transfer become the main force of advancement. Technological evolution and innovations are now seen as an outcome of productive interconnections between businesses, universities and state institutions integrated into one national innovation system (NIS) (OECD, 1997).

Etzkowitz (2008) addresses idea of industry, state and academia’s roles being constantly transforming. He points out that, even though they keep their individual characteristics and functions, additional functions of one another are observed. Moreover, fewer boundaries between institutions in society lead to more flexible systems formation. This phenomenon is reflected in the Triple Helix (TH) model of University-Industry-Government (UIG) interaction (Etzkowitz and Leydesdorff, 1996). Authors explain it by demonstrating the TH regime when all three helices or actors start to be engaged in a mutual relationship and fairly inter-depended performance. Likewise, they are being transformed due to occurred changes in settings.
Taking into account these transformations, innovation policies have started to be re-assessed and modified. Involvement of more stakeholders in economy and innovation system has complemented to the urgency of this issue. The worldwide process of spreading open innovations initiated creation of new approaches in public policies design (Pelkonen, 2006). In the era of globalization, networking and Information and Communication Technologies (ICTs) countries, regions and elements within national innovation systems find themselves being interdependent. Subsequently, policies should reflect and sustain those new ways of cooperation (ibid).

Russia is not an exception: over the last decades innovation has been in a spot of increased attention in the country (OECD, 2005; 2007; 2011). Russian government regards creation of an innovative economy as the main priority. Nevertheless, Organization of Economic Cooperation and Development (OECD) underlined that, in order to uphold growth and foster the knowledge production, Russia should shift the economy from excessively strong reliance on natural resources to focus on innovation (2007). The same goal was also reflected in the Main Priorities of Russian Policy in the Area of Development of Innovative System For the Period Until Year 2010 (2005) in the form of an action plan on moving towards innovation-based economy. With the transition made to a market system, the country’s science and technology have experienced considerable difficulties. Despite the fact that countries with a transition economy are able to have quite developed innovation system, connections between its parts are usually very complex and, to some extent, obsolete. It is often the case that government, industry, Higher Education Institutions (HEIs) and science are not ready for vital transformations (Dezhina and Kiseleva, 2008). During the last decade Russian state has focused not only on NIS development, but also on integrating it into the global world (Dezhina and Zashev, 2007).

Starting from 2000 formation of the modern version of Russian innovation policy has been initiated. Main goal of the first policy decree¹ was to create functioning innovation system. It attempted to cover legislation, financial aspects, innovation encouragement and development of infrastructure (Savitskaya, 2009). Further, Russian Program of Modernization of Higher Education until 2010 (2002) has stressed the necessity of the new quality level of interactions between academia, industry and state authorities on regional and national levels. Despite the fact that at that time no evident success in the creation of competitive innovation policy has been achieved (Dezhina and Kiseleva, 2008), it was an inception of policy framework for UIG interaction formation.

¹ Decree “On framework for policy of Russian Federation in the field of science and technology for the period till 2010 and future perspective” (2002)
Now researchers discuss have those measures and policies been productive or not. In fact, Dezhina and Zashev (2007) point out that creation of the market-oriented innovation system in Russia started 15 years ago, but still many components remain centralized. Despite the efforts that Russian government takes to stimulate innovation (laws advancement, special economic zones creation, mega projects initiation, venture funds establishment and etc.), problems in the area are obvious. First of all, the state regulation of innovation activities is completely dominating. Second, Russian industry is not sufficiently connected to research and education sectors. Third, the separation between science and HEIs creates a number of barriers for systemic evolution.

Within the context of innovation system creation, a number of studies have been dedicated to investigation the University-Industry (U-I) relations that occur in transforming Russian environment (Dezhina, Kiseleva, Zashev, Telegina, Krakovetskaya and etc.). It has been stressed that Russian government supports U-I connections as ensuring economic growth in the region and providing additional support to research and development (R&D) sector in times of reduced state funding. Consequently, the dynamics of their interaction in the country has increased. However, as government holds a leading position in controlling the innovation system, the majority of vital changes are initiated with a top-down approach, which includes public policies. Therefore, it raises a question of how a three dimensional UIG interface is considered in national action plans. As Russian innovation policy is still being formulated, a constant research and feedback (both positive and negative) from NIS actors is required (Dezhina and Zashev, 2007).

1.2 Purpose of the study

The present thesis attempts to contribute to the UIG relations studies in Russia in light of recent innovation policy actions. It addresses the issue of how Russian innovation policies from early 2000 support UIG interaction and its development. Particular attention is paid to the TH model in the Russian setting. Russian particularities will be highlighted as western experiences cannot be fully applicable in the post-Soviet environment. It is a fact that the impact of innovation policy differs among countries due to political, cultural and economic diversity (Telegina and Krakovetskaya, 2008). Russian scholars have contributed to the field by providing analytical reviews of international experiences and later analyzing Russian milieu. At the same time, there is insufficient number of studies on how UIG interaction is integrated and promoted in national innovation policy (ibid). Since they regularly transform and new state initiatives are constantly being introduced, current research aims at exploring how, in what way and to what extent those changes affect consideration of UIG interaction by the state.
1.3 Scope of the study

Taking into account a vast phenomenon of UIG relations, the study puts its focal point on national level. As large number of universities and businesses exist on the Russian territory, it would be difficult to create a representative case of the UIG interaction from their perspective in the framework of the master thesis. Therefore, the focus on national policies is considered reasonable. To narrow down the research’s scope, issues of how UIG relations are incorporated into state innovation policies and what are the particularities of their consideration are investigated.

The study relies mostly on information gathered from policy documents and national reports and can be characterized as policy analysis. Extensive document review constitutes the thesis’s foundation and is supported by several in-depth interviews to acquire additional insights on the subject. Background information about governmental policies and relevant literature review will be provided to complement the study. Research design and methodology will be explained in detail in Chapter 2.

1.4 Research problem

The thesis aims to explain how Russian innovation policy facilitates or hampers UIG relations in the country. The TH model of UIG interaction has been applied in order to frame the study. It allows comprehending how the Russian state stimulates those connections and what are their specifics in the Russian context.

Therefore, the main research problem has been formulated in a following question:

- How UIG interaction in Russia is addressed by Russian national innovation policies?

For the purpose of examining this issue, several sub-questions have been elaborated:

- How UIG interaction is reflected in Russian national innovation policies?
- How the Triple Helix model is applied in policies on UIG interaction?
- What are the main policy barriers for UIG interaction in Russia?
- What are the tendencies of UIG relations development with reference to Russian innovation policies?
Main policies in question include: Main Directions on NIS development until 2010, the Strategy of Development of Science and Innovation until 2015, the Strategy of Innovation Development until 2020, Long-Term Forecast of Science and Technology Development until 2025, the Concept of Long-Term Social and Economic Development until 2020 and a number of other related policies and decrees on innovation, S&T and education.

Thus, the present research is a policy analysis in nature and investigates how UIG interactions are managed by the Russian state. It also analyses the governmental response to the worldwide trend of three spheres – state, university and industry – moving towards each other, taking additional roles and creating hybrid organizational forms.

1.5 Delimitations of the research

Delimitations of the research derive from the research schedule and requirements, nature of the study, topic particularities and specifics of the Russian context. The present thesis faces two main limitations.

Firstly, one can argue that researching only the state’s view on UIG interaction disregards perspectives of two other sides. However, limited research period, resources and required thesis volume leave us with the necessity to investigate only a part of the social phenomena. In order to conduct the current master research, the focus was narrowed down to one particular issue which is relevant at the moment. Furthermore, several key policy documents have been written with the participation of all three sides’ representatives. Some perspectives of industry and HEIs will also be discussed, but it is important to indicate that accessing how academia and industry transform UIG interaction in Russia was not among thesis’s aims.

Secondly, the document analysis as a thesis’s main methodology approach may raise some concerns. It could be claimed to be not as effective as interview or questionnaire-based study due to secondary data involved and lack of personal reflections on the issue. However, taking into account Russian geographical and organizational characteristics, the more cost effective research method has been chosen. Additionally, while doing policy research, document analysis is unavoidable as Russian state initiatives are communicated in the form of federal decrees. All major policy documents (concepts, plans, strategies and etc.) are up to date and available in the open electronic access. In order to reduce possibility of research errors, documentation and secondary information for analysis have been gathered exclusively from official sources. Additionally, several face-to-face
interviews have been conducted to ensure research reliability and avoid policy misinterpretations (see Chapter 2 for details).

Overall, the author hopes that above described shortcomings do not degrade the thesis quality. Responding to the present study’s research questions is seen as an opportunity to gather some interesting insights into the UIG interaction in Russia.

1.6 The structure of the thesis

Chapter 1 (Introduction) provided the topic background and motivation, study purpose and delimitations. The research problem was stated and supporting questions were elaborated to create the framework of the thesis. The study plan concludes the first chapter.

In Chapter 2 (Methodology) research methods will be introduced. Usage of qualitative methods will be justified by relevant literature on conducting social research. Then, the research design of the study and data collection methods will be explained in detail.

Chapter 3 (Theoretical framework) will be devoted to central concepts and theories. It will cover issues of UIG relations, innovation systems and national innovation policies. Through the previous research the issue of how innovation policies address UIG interaction will be discussed. To conclude, the Triple Helix Model of UIG interaction will be presented.

In Chapter 4 (Analytical framework) the framework for analyzing the UIG interaction in Russian innovation policies will be developed.

In Chapter 5 (Russian innovation system and innovation policy) the main purpose is to investigate Russian context. Russian innovation system and policies as well as the role of government will be explored.

Chapter 6 (UIG interaction in Russian innovation policies) will present an analysis of how development of UIG relations is managed by Russian innovation policies.

In Chapter 7 (Conclusions and implications for further research) the major findings and suggestions for further research will be elaborated. Additionally, the main obstacles to UIG development in Russia will be identified.
2 METHODOLOGY

2.1 Introduction

The undertaken study is qualitative in nature. Denzin and Lincoln (2000) provide a basic definition of qualitative research as “a situated activity that locates the observer in the world” (ibid: 3). Qualitative researchers explore a phenomenon in the ordinary setting and interpret it for others. Exploration is made empirically and can take a variety of forms: case studies, personal experience, introspection, interviews, texts, pieces of art and etc.

Marshall and Rossman (1999) consider qualitative research as a common mean of studying social phenomena. They include observation, participation, interviews and document analysis in this category. Creswell (2003) confirms that observation (participant and non-participant), field notes, journals, interviews (structured, semi-structured and unstructured) and analysis of documents are used for gathering qualitative information. As each of these methods provides a particular vision of the social phenomenon, a combination of them is highly valuable (Denzin and Lincoln, 2000; Maxwell, 2005). It helps to reduce chances of inaccurate and ambiguous results by seeing more detailed image. In addition, multiple methods may be used due to the fact that no single way of data collection is perfect.

Hancock et al. (2007) point out that qualitative research aims at providing a deep understanding of how things happen and why they occur in a certain way. It yields a real-life context and usually answers questions how, what is the view of, why. Qualitative studies begin with a general idea and may result in new concepts development or in evaluation of existing processes (ibid). Likewise, Maxwell (2005) argues that they show how something occurred, which is applicable to the present thesis (see Section 1.4 of Chapter 1).

The level of the study is indicated in the research problem (“How Russian national innovation policies address, support and hamper UIG interaction?”). It can be characterized as a macro-level analysis as the study focuses on the particular country’s national innovation policy. However, the thesis puts its focal point only on one particular aspect of the phenomenon – UIG interaction. Yin (2003) points out that if research has specific propositions, there are more guarantees that it will stay within feasible limits. Therefore, this fact should be carefully considered by the investigator, otherwise he or she can make a mistake of trying to “cover everything, which is impossible to do” (ibid: 23).
While analyzing national innovation policy, it is not possible to cover all cases that occur within the governmental system – it will make the study unfeasible. Therefore, narrowing the topic down was crucial. Creswell (2003) also developed an idea of qualitative research dealing with many variables *rather than with many cases* (ibid: 15). As a result, it allows not basing the study on subjective expert opinions on the policy, but creating a more objective overview of the topic.

2.2 Research design

To frame the study an interactive model of research design developed by Maxwell (2005) was applied. It consists of five research components that are strongly connected and influence each another: (1) goals, (2) conceptual framework, (3) research questions, (4) methods, (5) validity (ibid: 4). Graphical representation of those components integrated into one system can be seen in Figure 1.

![An interactive model of research design](image)

**Figure 1. An interactive model of research design**

In the model research questions function as the connecting part and other elements are organized around them. Linkages within the model are not fixed that causes multi-directional interaction. Due
to interactive nature of the model, all its elements are inter-dependent and changes in one box are followed by corresponding alterations in others. There are more issues that influence model’s components called contextual factors. They depend on the particular situation (setting, data, time period) and researcher’s individual circumstances (skills, standards, logic). Obviously, these factors differ in every research.

Maxwell (ibid) points out that the model’s value is in avoiding thinking and acting within fixed linear structures. It is advantageous for the present study as corrections are possible at any stage. In fact, it has been applied in the present thesis, when literature review has revealed the necessity to adjust initial research questions. Overall, the choice of the research method should be closely connected with the actual conceptual framework, questions that the study addresses and approaches to check data validity.

Ethical issues are not included in Maxwell’s research design as a separate section. He does not discourage them in qualitative studies; on the contrary, Maxwell (2005) explains that increased attention should be paid to ethical considerations in every part of the research. However, in order to have a clearer structure, the thesis contains them as an independent section of the methodology. Thus, the design of the present research is reflected in Table 1.

<table>
<thead>
<tr>
<th>#</th>
<th>Section</th>
<th>Questions to consider</th>
<th>In present study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Goals</td>
<td>• What issues the study covers and why they are relevant?</td>
<td>• Innovation is stated as a national priority. The necessity to create competitive system is a long term goal of the Russian state. Specifically, government focuses on building strong relationships between all actors: state, industry, science and education.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• How acquired results may be useful?</td>
<td>• Results of the study can draw attention to pros and cons of innovation policy in Russia in terms of UIG interaction support. It will show to what extent UIG interaction is addressed by existed policies. Together with further investigations of industry and academia perspectives, it will contribute to the innovation policy and UIG relations studies in Russia.</td>
</tr>
<tr>
<td>2</td>
<td>Conceptual framework</td>
<td>What theories, prior research findings, personal experiences and ideas guide the research?</td>
<td>UIG interaction concepts, the TH model; innovation system and innovation policy theories</td>
</tr>
<tr>
<td>3</td>
<td>Research questions</td>
<td>What this research investigates?</td>
<td>UIG relations development that is reflected in current Russian innovation policies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What is intended to be understood?</td>
<td>How Russian innovation policies develop the issue of UIG interactions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What question(s) research attempts to answer?</td>
<td>How UIG relations are incorporated into Russian innovation policies? How Russian innovation policies address the TH model of UIG interaction? What are the main obstacles in this process? What are the tendencies of UIG relations development in Russia with reference to innovation policies?</td>
</tr>
<tr>
<td>4</td>
<td>Methods</td>
<td>What techniques of data collection and analysis this research applies?</td>
<td>Literature review, document analysis and several in-depth interviews.</td>
</tr>
<tr>
<td>5</td>
<td>Validity</td>
<td>How might results and conclusions be wrong?</td>
<td>Wrong interpretations, ambiguous or contradictory policies, wrong cause-effect relations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How the data supports or contradicts the initial idea?</td>
<td>Data for the most part supports the initial idea of UIG being not sufficiently promoted by the Russian state. However, several cross-observations have been made</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Why the results are reliable?</td>
<td>Multiple sources and methods, reliable sources, only official documents used, cross-checking with other research, awareness of validity issues, member check</td>
</tr>
<tr>
<td>6</td>
<td>Ethical issues</td>
<td>How participants and gathered data are protected from misinterpreting and misusage?</td>
<td>Participants - clarifications, further meetings; data - obtaining information from authorized sources, cross-checking, revisions of the draft.</td>
</tr>
</tbody>
</table>

Source: based on Maxwell, 2005

### 2.3 Data collection methods

In the present research qualitative methods have been applied in a form of extensive document analysis (main method) and a number of in-depth interviews.

Document analysis is used to review records that have been already created, for instance, policy documents, mission statements, annual reports, minutes of meetings, web sites, letters or emails and etc. It enables researchers to work with large amounts of data and can be used to explore “the focus of individual, group, institutional, or social attention” (Weber, 1990 in Stemle, 2001: 1). It also allows investigating various societal trends, patterns and opinions reflected in documents. If a large scope of research or territory must be covered, this type of data collection is able to save valuable research time while providing valid results.
A high degree of accuracy can be reached when documents are obtained from official sources and prepared by people in charge on the governmental or organizational level. Considering Russia’s geographical characteristics (e.g. size, remoteness), it is an extremely suitable option for the policy analysis. The cons of this method are associated with the level of data complexity. It may take some time for the researcher to understand information structure, logic and language. However, once the initial comprehension is acquired, other policy documents are easier to analyze.

In-depth interviews have been adopted in order to have a wider outlook of the research problem. The purpose of an interview is to access information that is not available in open sources. Folkestad (2008) indicates that it leads to a fresh understanding of a social phenomenon. Marshall and Rossman (1999) explain that in-depth interviews consist of open-ended questions and are used to gather people’s perceptions. They are carried out in the form of free conversation about the researched subject and may be recorded for further clarifications in case of obscurities. In-depth interviewing can be conducted with a small number of respondents to collect their ideas on particular program, policy, or situation (ibid). They are especially valuable when combined with other methods of data collection (Boyce and Neale, 2006).

An in-depth interview provides a comfortable setting for having an open discussion. As it was not intended to influence our respondents with structured questions in such sensitive for Russia topic as the state policy, this method was selected instead of previously planned semi-structured interviews. It allowed being flexible and follow the information that had appeared during the conversation. Interviews were not totally unstructured; they had a form of a guided discussion in order to gather information from interviewee’s area of expertise. One of this method’s disadvantages is difficulty in interpreting results, as there is no common conversation structure. However, as only five interviews were made, the time consumed for data interpretation is reasonable. As an additional insight, four secondary interviews have been analyzed due to their high value.

As can be seen from the above, indicated means of studying the phenomenon have been chosen due to a number of reasons. First of all, textual analysis is an obligatory tool when the national policy is investigated. Second, the size and diversity of Russian territory has been taken into account, as it restricted the study in terms of using interviews as a main research tool. Therefore, methodologically the thesis for the most part relies on extensive documents review. It is believed that such research design is applicable in addressing the stated research problem.
2.4 Data collection and interpretation process

As it was discussed in the previous section, the research is based on evidence from related literature, recent authorized *documentation* (2000-2012) and several interviews. The body of our literature review (Chapter 3) covers relevant studies previously undertaken by other researchers on innovation policy and UIG interaction internationally and in Russia. Secondary data and analytical reports from other organizations (for example, OECD records) were studied in order to complement the research. Documents have been reached through web pages of official bodies, e-mail correspondence with people in official information channels, on-line databases on innovation. Appropriate quality and reliability of data is based on its location (governmental web pages, research organizations and etc.) and its validity period. This approach has allowed having sufficient data from various sources.

In order to present a convincing argument on UIG interaction reflected in Russian innovation policy, several important policy documents have been thoroughly analyzed:

- Principal Directions of the RF Policy in the Sphere of Development of Innovation System for the Period of up to 2010, passed in 2005 (further – the Principal Directions).
- The Strategy of Development of Science and Innovation in the RF for the Period until 2015, passed in 2006 (further the Science and Innovation Strategy).
- Long-Term Forecast of Science and Technology Development in the RF until 2025, passed 2006, (further – the S&T Forecast).
- The Concept of Long-Term Social and Economic Development of the RF until 2020, passed in 2008 (further – the Concept).
- Federal Decree “On education” (last modification – 01.02.2012).

Additional documents and articles have been reviewed from the Ministry for Education and Science, Ministry of Economic Development, Federal Agency for Education, Committee for Economic Development, Federal State Statistics Service. All the records obtained have been written in Russian language which omits possible language-related misinterpretations.

Four in-depth interviews lasted approximately 40 minutes and were conducted in Russian language. They have been digitally taped for further analysis with the permission for additional clarification.
with an interviewee. Two additional 20 minutes meetings have been requested in order to shed the light on several unclear statements. Main interview questions were related to UIG interaction in general, Russian innovation policy development and present condition, government participation in UIG interaction, building up UIG interaction process in Russia and its maintenance on different levels, positive changes and obstacles for innovative projects. Taking into account interests of the respondents, their names will stay anon anonymous while the professional positions are the following:

- Innovation Center Director, policy level (1)
- Innovation Project Leader, U-I relations specialist (1)
- Innovation Project Leader (1)
- Entrepreneurship Center, Director of St. Petersburg branch (1)

Additionally, four secondary interviews published in official sources will complement the empirical part of the thesis:

- Interview with Vladimir Putin as the Head of Russian Government (2011)
- Interview with Sergey Ivanov, Deputy Prime Minister (2010)
- Interview with Alexander Uvarov, Vice Rector on Innovative development and International Activity of Tomsk State University of Control Systems and Radioelectronics and the TH model expert (2011)
- Video lecture and discussion with Igor Fedyukin, Vice Minister for Education and Science, Director for Applied Research at Russian New Economic School (2011)

In order to interpret information obtained from the records, content analysis has been applied. It was assessed by Krippendorff (2004) refers to it as one of the “potentially most important technique in social science” (ibid: 13) as it helps to identify trends and patterns in documents as well as observe changes in public opinions on a particular policy, mission, or concept. Bryman (2004) points out that applying this approach one can recognize the most important topics and points. Additionally, Marshall and Rossman (1999) confirm that content analysis can provide adequate results while being time and resources effective. It also has no influence on the research setting itself which leads to more objective results (ibid). Interviews have been examined by similar means. Categories, which were elaborated during document review and within developed analytical framework (Chapter 4), have been applied to interpret recorded conversations. As a matter of fact, interviews were used to support or contradict information obtained from document and literature.
2.5 Sampling

Neuman (2000) argues that sampling in qualitative studies noticeably differs from quantitative research. It puts its focal point onto enriching and expanding of phenomenon’s comprehension not through amount of cases, but by means of particularly important ones.

“Qualitative researchers focus less on a sample’s representative or on detailed techniques for drawing a probability sample. Instead, they focus on how the sample or small collection of cases, units, or activities illuminates social life” (Neuman, ibid: 196).

Sampling approach of a study can be established in advance or adjusted whilst researching the issue (Hancock et al., 2007). In the thesis it was intended to use a critical case sampling that is based on particularly significant and informative positions, persons, organizations and records. On the one hand, this approach has been successfully applied in the document analysis section. The main policy records were chosen according to their (1) relevance, (2) legal status, (3) scope of content, and (4) validity period.

On the other hand, in the field interview section people who held high positions in policy making and implementation at the governmental level have proved to be inaccessible. Moreover, only several people (as on the policy level particular individuals are responsible for specific tasks) could represent particular issues. As a result, in order to obtain additional insights on the policy statements, people that are related to innovation and UIG interaction, were available over the research period and possessed necessary expertise were identified. Additionally, interviews’ sample contains secondary sources’ discussions that have been selected according to their relevance and persons’ positions in relation to policy making and implementation. The interview section (both filed and secondary sources) has complemented the research sample with an aim of bringing supplementary clarifications to policy documents.

2.6 Data validity and reliability

An important issue of any research is to consider and ensure data validity and reliability. Despite the fact that these issues are difficult to apply in qualitative studies, discuss their main postulates will be briefly discussed.
Kvale (1995) understands a qualitative study as constant struggle between different interpretations: they may compete, contradict one another and lead to ambiguous results. Therefore, it can be seen that the notion of validity in qualitative research is, to some extent, connected with the researcher’s philosophical perceptions.

Lincoln and Guba (1985 in Bryman, 2004) describe various ways of ensuring qualitative data validity: member check, interviewer confirmation, peer participation, negative case analysis and other. They also define the primarily criteria for accessing qualitative research: trustworthiness and authenticity. Trustworthiness is ensured by credibility, transferability, confirmability and dependability confirmed by the authors’ findings. A study is considered authentic if it covers the whole topic fairly, allows better comprehension of the problem (which is the general aim of qualitative research) and stimulates further actions or subsequent changes.

Trustworthiness of the study is believed to be derived from the official origin of the information that is easy to check – sources used are officially published and transparent. The study is also connected with a larger picture of UIG and innovation policy research in Russia and abroad and is developed as a part of a broader context. Regarding authenticity, the present thesis attempts to cover all issues of innovation policy related to UIG interaction and concludes with recommendations that can be taken into account while developing new course of actions in policy development process in Russia.

Reliability of the study derives from the level of data accuracy that can be reached by comparing with other research results and using several research methods (Maxwell 2005). Typically qualitative studies rely on data combination obtained from various sources using several methods. This common principle is called triangulation and it decreases the amount of errors or limitations caused by a single method. Ultimately, it ensures better validity of elaborated results (Denzin, 1970 in Maxwell 2005). Flick (2009) links the level of reliability to the author’s interpretations of information obtained.

In the thesis, while conducting document analysis, a thorough review of documents has been done to avoid missing or incomplete documents. A number of inappropriate records were discarded: (1) those that did not fit into the research framework; (2) those that contained obvious mistakes; (3) those of unclear origin; (4) those that were difficult to interpret and could have led to wrong conclusions. Interpretation of the policy information, general situation and data itself are based on
the researcher’s viewpoint and made personally by the researcher using theoretical and analytical framework as guidance.

The study can be considered reliable due to several reasons: (1) it uses several research methods and (2) results are compared with other research done on the issue. Acquired data has been compared with other related results in order to ensure reliability (OECD, Era Watch, Dezhina, Kiseleva, Gokhberg and etc.). To guarantee interviews reliability, a member check and confirmations have been used to avoid misinterpretations. Moreover, conversations were digitally tape-recorded that is proved to be more reliable than handwritten scripts. Guidelines for the interviews were prepared by the author in advance in order to focus the discussion and prevent taking the wrong direction. Beforehand all respondents have received overview of the thesis’s scope. Moreover, following the Siverman’s (2010) viewpoint, a detailed explanation of the context is presented in order to decrease risks of false interpretations.

2.7 Ethical issues

Concurrently, ethical issues have been taken into account while conducting the interview section of the study. Some data has been required to be kept confidential for personal or corporate reasons. The information from the interviewees will not be revealed to any other side or company and will not be published. In order to avoid confusions about the study purposes, an outline of the thesis project has been provided along with the official letter from the university. Concerning literature review, all documents, officially published interviews and previous research projects are correctly referenced and quoted. If a document was retrieved from the Internet, this information is provided in the bibliography along with the correct link.
3  THEORETICAL FRAMEWORK

In this chapter theoretical and conceptual frameworks of the thesis will be developed. It provides explanations of main issues to be investigated, introduces different viewpoints and identifies relationships that exist within the researched field. In order to study the phenomenon of UIG interaction in Russian innovation policies, different concepts of UIG relations will be examined and compared. Furthermore, the notion of innovation policy will be discussed. The chapter concludes with the introduction of the Triple Helix model of UIG interaction and its application in Russia.

3.1 University-Industry interaction in a knowledge-based economy

The subject of UIG interaction is now widely discussed in scientific literature. Moreover, it has gained worldwide interest of policy makers, economists and academics since 1970ss, which is confirmed by a number of OECD reports from different years. One of the reasons for this trend is the stressed importance of connections between universities and industries for any advanced economic system. Etzkowitz (2008) also argues that UIG interaction is crucial for prosperity in a knowledge-based economy. He claims that such relations foster innovative development even if they take various forms and appear in different parts of the globe.

Researchers usually indicate three main channels of U-I relations: (1) training of skilled labor force, (2) social networking, and (3) formal two-side contracts formation (ibid). The most traditional function of university is providing industry with educated human resources where they apply acquired theoretical and some practical knowledge. Informal contacts were described in 1974 by Gibbons and Johnston. Those interactions exist within alumni networks and friends’ circle obtained in universities (usually from the same field) or occur during scientific conferences and other professional events. Two-side contracts are the formal acts of collaboration between HEI and a company. It can be established on a variety of issues and includes joint research, consultancy, university spin-offs and other.

In recent years with more studies conducted on knowledge economy and innovation economy (for example, Rooney, Hearn, Ninan, Druker, Smith, Powell and Snellman, Brinkley), the idea of subsequent transformations within the knowledge production and transfer has been elaborated. It has also raised a question of how university and industry are connected and what roles they take in the modern environment.
Peter Drucker (1996) has initiated the process of worldwide spreading of the “knowledge economy” term. Afterwards, this phenomenon and its main characteristics have been explored by other authors. OECD (1996b) defines it as economy based on the creation, allocation and application of knowledge and information. Nevertheless, the broad notion of knowledge economy has a wide range of interpretations. Most scientists explain that it emerged in a response to technological transformations and ICT revolution started in 1950s. As a result, countries’ development has become mostly driven by knowledge-based technologies and information production (Powell and Snellman, 2004).

According to OECD (ibid), all OECD nation states experience a shift towards new economies, although those movements have different speed. Importantly, society has changed from industrial to knowledge-based in the majority of developed countries and now not only businesses are considered as important contributors to economic development. Gibbons (1994) contrasts traditional knowledge (Mode 1) to knowledge that is created in a broader social and economic context (Mode 2). Being produced outside the academic environment, Mode 2 is interdisciplinary and socially relevant, while Mode 1 is disciplinary oriented with few linkage between research and its purpose. The most important difference is that Mode 2 knowledge is created in the context of application, where relations between HEIs, industry and community are of a great importance (ibid). However, this approach has been criticized for its detachment from reality (for example, Godin, 2008).

Industry has always been one of the key stakeholders of HEIs, providing jobs for graduates, practical insights into theoretical issues, information channels and financial support. In modern constantly changing environment the dynamics of its interaction with academia is transforming. Jacob et al. (2000) identified the start of a next phase in the U-I relations: transfer from sponsorship to partnership. As a result, a number of universities around the globe go beyond traditional academic departments to join with industry and become entrepreneurial. From the industry perspective, such U-I partnerships are seen as a better way to organized economic activities (Sardana et al., 2006). For both sides the key issue remains to ensure desired competitiveness through technology and, consequently, innovation. At the same time, it can be developed and improved by means of U-I cooperation itself as a win-win process (Wu, 2000). On the one hand, technology is straightly connected with industry’s capability and production results. On the other hand, HEIs use technological innovations in R&D in order to improve knowledge production.
U-I relations can face a number of obstacles as there are risks from both sides connected with failures, inconclusive results and cancellations. The most frequent problem is the difference in basic goals and understanding of the key notions. First of all, academics traditionally tend to preserve their freedom to pursue own interests. In some cases, the Humboltian ideal of “science for its own sake” is still strong. On the contrary, business sector is more purpose-oriented and flexible with the strong focus on profit. Therefore, lack of organized cooperation and policies can neglect potential benefits for both university and industry as well as for the country’s economy (Heaney et al, 1996). Second, notions that both sides apply can have different meanings as university and industry used to represent two absolutely different cultures (Gassol, 2007). Universities’ goal ambiguity and loosely coupled structure (Clark, 1983) also create barriers for observation, creation and control of the interaction processes.

One cannot eliminate the role of government in supporting or restricting the cooperation between HEIs and industry. Etzkowitz (2008) consider government as a preserver of rules and equity in the society and as a third important element in U-I cooperation in any country. The state traditionally has the leading role in promoting technologies and innovation through laws and different incentives. Governments can stimulate innovation and U-I relations through advanced policies, strategies and programs. The issue of governmental policies will be further discussed in detail in Section 3.6.

3.2 Innovation and University-Industry interaction

Before talking about the role of U-I relations in innovation, some initial definitions should be provided. Different scholars have focused their attention on the notion of innovation, which can be understood broadly. Schumpeter was among the first ones to explain it using the adjective “new”: new products, processes, organizational forms, markets (Schumpeter, 1934 in Lundvall, 2007). In the present study the definition by Schilling (2006) is considered the most appropriate. He sees innovation as a process of generating new ideas that may be further transformed into products, services or practices. Therefore, this explanation notably includes the issue of commercialization.

The process of innovation involves interface and integration of a wide range of actors in the society and creates national innovation system (NIS). This notion was developed by Freeman (1987), Lundvall (1992) and Nelson (1993). Nelson (ibid) defines NIS as a number of knowledge organizations and interactions between them that “determine innovative performance of national firms” (ibid: 4). Balzat and Hanusch (2003) describe it as an economy’s segment “in which various organizations and institutions interact and influence each other in the carrying out of innovative
OECD (1997) describes four issues in NIS evaluation: (1) interactions among enterprises, (2) interactions among enterprises, universities and public research institutes, (3) diffusion of knowledge and technology to enterprises, and (4) personnel mobility. In the long run, the firm performance depends on the level of cooperation within these categories. Furthermore, the whole concept of NIS is based on importance of interactions between the actors of the innovation process. Technical progress is seen as a result of knowledge production, application and transfer that occur in those relations. Therefore, a country’s innovative performance to a large extent depends on how the state, universities and industry collaborate within one system. The general overview of NIS idea is shown in Figure 2.

**Figure 2 Innovation system: actors and their interaction**

3.3 Knowledge and technology transfer

While talking about innovation and U-I cooperation in the age of knowledge economy, some brief clarifications on technology and knowledge transfer are necessary. Its initial challenge derives from a variety of ways to define technology. Scholars depict this term differently – as a study of the practical industrial arts or scientific terminology or applied science or a tool and etc., but their relevance is arguable now (Bozeman, 2000). At the same time, Sahal (1991, 1982 in Bozeman, 2000) describes technology as a more complex structural arrangement of produces, processes and knowledge about them. He points out that in order to study the transfer, not only the final product, but also the information about its further application should be in focus. Bozeman (ibid) also suggests that knowledge transfer includes technology transfer being a broader phenomenon than the latter.

In general understanding, technology transfer is the process of conveying skills, innovations, methods or equipment among various institutions. Its multiple outcomes are frequently difficult to indentify (Bozeman, 2000). In organizational sciences knowledge transfer refers to transmitting knowledge from one organization to another. Such experience exchange may occur within only one institution (Argote and Ingram, 2000). Clark (1998) states that knowledge transfer refers to a voluntary desire of HEIs to bring findings to the market through creation of spin-off companies, licensing and managing intellectual property.

The research confirms the lack of studies on knowledge transfer and commercialization in countries with post-Soviet economies. At the same time, some existed studies (Dezhina, 2008; Muscio, 2009; Vadi and Haldma, 2010) shows that conveying knowledge to the industry as well as U-I linkages are still underdeveloped in many ways. Due to the systemic change from the command to the market economy, HEIs have modified their purely educative role towards being a generator of economic wealth in the society through “knowledge capitalizing” (Vadi and Haldma, 2010: 491). The process and actors of knowledge transfer can be seen in Figure 3. To stress the importance of universities in the dynamics of interaction they have been placed in the middle of the scheme.
3.4 Transforming role of universities

Speaking of knowledge transfer, vital transformations in university functions ought to be explained. Currently innovation is increasingly considered as driven primarily by knowledge, not by businesses. In such environment the role of university is more than ever emphasized. It has been re-accessed from provision of a basic scientific knowledge to innovating of national economies (Gunasekara, 2007).

Contribution of higher education to the country’s innovation can be observed in several ways. First, universities carry out fundamental research which, in the long run, creates a foundation for regional and national development. In case of Russia, this role fulfills Russian Academy of Science (RAS), a
separate scientific organization. Second, universities are engaged in applied research that connects academia and industry and, at the same time, facilitates the creation of business incubators and scientific parks. Third, they attract high-technology corporations to the region. And finally, universities not only provide qualified labor force and researchers, but also ensure the transfer of knowledge (Telegina and Krakovetskaya, 2008).

The topic of university contribution to innovation has gained a lot of scientific attention in recent years. OCED program on Higher Education in Regional and City development\(^2\) (2005-2012) states the impact of HEIs on development of NIS in times of globalization. It is widely discussed in literature that university has been transformed towards its third role – fostering regional economic and social development. Webster (1998) also describes HEIs as generators of regional welfare. Focus on regional rather that national dimension derives from the point of view that investigation of a particular region brings better understanding and wider perspective on innovation (Howells, 1999).

Gunasekara (2007) identifies two different directions in theorizing U-I research. The first one is strongly connected with the TH approach by Etzkowitz and Leydesdorff (1996, 1997, 2000), which links university, industry and the state. The second approach describes university’s connection to the region where it is located. This concept is called engaged university (Chatterton and Goddard, 2001) and it underlines universities’ contribution to regional development. Gunasekara (2007) points out that this theory “emphasizes adaptive responses by universities, which embed a stronger regional focus in their teaching and research missions” (ibid: 3), connecting the importance of university activity with a broader mission of stimulating region’s advancement. In addition, Holland (2001) defined engaged university as oriented on external interaction, societal needs and mutual production and application of knowledge. As a result, roles of both university and industry have become more dynamic. Maassen and Cloete (2002) also described university as industry approach, which identifies universities as providers of goods and services. As a result, HEIs start resembling businesses.

The concept of entrepreneurial university is also devoted to the changed role of university. Burton Clark in his study “Creating Entrepreneurial Universities” (1998) develops five elements of university transformation into the entrepreneurial institution: (1) a strengthened steering core; (2) an expanded developmental periphery; (3) a diversified funding base; (4) a stimulated academic

\(^{2}\) The program of OECD that covered 14 regions and 12 countries in 2004-2007 (first round) and 14 cities and 12 countries in 2007-2011 (second round). Details and reports are available at www.oecd.org
Clark (1998) believes that entrepreneurial pathway is the only adequate way of the university’s development. He supports this argument with several case studies on successful European HEIs that are actively involved in collaborations with industry, continuing education, fundraising and alumni affairs. Therefore, entrepreneurial universities are important in development of productive U-I relations as they promote valuable changes on the institutional level. Having in mind rigid structure of HEIs (described in detail by Clark, 1983), it can be considered as an essential step forward. Some other researchers (for example, Shane, 2004) link the degree of entrepreneurship in university only to the creation of spin-off companies, which, when considered alone, can be arguable in the modern (when, for instance, discussing entrepreneurial approach to teaching – another important indicator of academic entrepreneurship). Nevertheless, there is still a lack of detailed studies on how different types of countries embrace “entrepreneurial university” concept.

3.5 Models of University-Industry-Government interaction

Several scholars have elaborated models of UIG relations in order to explain behavior and roles of every dimension. Several of them are discussed below.

Burton Clark (1983) in his book “The Higher Education System” argues that the three forces of integration in higher education are state, market and professional (academic) system, graphically represented in the triangle of coordination (ibid: 143). This approach has been developed to compare national education systems around the globe. According to Clark, they can be coordinated primarily by the state, market forces or academic oligarchy. For instance, former Soviet Union (USSR) was described as a definitive case of an extreme government regulation; while the United States (the U.S.) was placed in a corner of market-driven and Italy of professorial-driven structure.
(see Figure 4). Nowadays Russia can be still characterized as a country with a strong governmental control. However, it is not located that close to the state authority edge any longer.

**Figure 4. The triangle of coordination**

Maassen and Cloete (2002) have also applied a concept of a triangle to explain changes that occur in complex interaction between the state, society and HEIs. They have adapted the Clark’s approach and discussed it within the context of higher education in South Africa in globalization era. However, their model is not completely static: it includes relations that influence and may change every dimension of a system. This concept was further developed in the synthesis report “Universities and Economic Development in Africa” (Cloete et. al, 2011). Three main forces were explained as government, universities and external groupings. Authors claim that, in order to ensure university’s impact on economic development, there should be stated agreements between the parties, which they have called a *pact* (Figure 5). Moreover, the capacity for such contribution should exist in the academic core of universities and there should be a clear coordination and interaction of the governmental policies, HEIs and external organizations, e.g. businesses, communities, associations (ibid: 66). Interestingly, Cloete and colleagues (ibid) do not provide the
image of one ideal combination of the forces, rather stress that even absolutely different modifications are able to be successful.

Figure 5. Dynamics of the relationship between the pact, academic core and coordination

Another model was created by Etzkowitz and Leydesdorff (1996, 2000) and reflects the dynamics of UIG cooperation – the TH model. Similarly to the triangle by Cloete et al. (2011), it stresses the interrelation and interconnectedness of all actors. However, the TH structure has a distinctive focus on national level, showing the process of UIG in a macro-perspective. At the same time, Cloete and colleagues investigate academic considerations to a greater extent, namely, academic core, university capacity and etc. Their model is more devoted to institutional perspectives on UIG interaction. Having this in mind, in the thesis the TH model will be used as the theoretical foundation. The model, its modifications and application in Russia will be discussed in detail in the following section.

3.5.1 The Triple Helix Model

Within the theoretical framework of the thesis, the TH model has a particular importance. Apart from university and industry, government is seen as an essential force that shapes the interaction process differently depending on the setting’s particularities. The extension has been made by
taking into consideration the crucial role of steering bodies in some countries that cannot be ignored. Government is able to avert market failures that may occur in totally marked-oriented systems. One of the TH structure’s definitive characteristics is its dynamic nature, which can be opposed to many linear structures existed before.

The TH model provides a framework for analyzing of the UIG relations and reflects the dynamics of their roles (Figure 6). This cooperation is mutual in nature and aims at improving each actor’s performance (Etzkowitz, 2008). Initially the model was introduced by Etzkowitz and Leydesdorff in 1996 to describe a dramatically new social contract between academia and society (Rodrigues and Melo, 2012). The model allows considering different forms of interrelation between three strands: universities, industry and the state. Creators of the THM claim that the country achieved the most effective linkage between the actors can reach faster economic growth. The main TH idea is that universities, industry and governments take some of the competences of each other, while keeping their own unique identities. The relationship between them is classified as somewhat equal, but interdependent (Etzkowitz, 2007).

**Figure 6. The Triple Helix model**

![Image of the Triple Helix model](source: Etzkowitz, 2008)

There are three modifications of the model: *first* – the state directs the relations between university and industry (for example, former USSR, some Latin American countries). The *second* is characterized by strong boarders between three spheres with highly restricted relations (for example, the U.S). In the *third* modification (the TH III) UIG roles are no longer fixed and the three dimensions are moving in a common direction with an aim to balance competition and cooperation (Etzkowitz and Leydesdorff, 2000). Authors of the model (ibid) claim that now most countries and regions are trying to develop a third variation – the *TH III*. Furthermore, nowadays the TH model is
being evolving towards its fourth generation that functions in the age of open innovation (Torkkeli et al. 2008).

There are four stages in the TH of UIG interface: (1) internal transformations within each helix, (2) establishment of primary connections between companies and research organizations and raising a hypothesis of universities’ contribution to regional development, (3) influence of one helix on another, and (4) formation of trilateral networks and hybrid organization by all the players to foster innovation and mutual evolution (Etzkowitz, 2008). As a result, universities organize incubators and establish companies; industry participates in education process through corporate programs and consultancy; government launches venture funds to support small and medium enterprises (SMEs), namely, the ones that have grown under the university umbrella.

However, some researchers, for instance, Brännback et al. (2008) criticize the THM as excessively macro oriented. They claim that it does not include case entrepreneurs, scientists and researchers, so they consider themselves excluded from the system. It decreases or even eliminates their interactions with governments. As a substitute, the authors (ibid) have introduced True-double Helix model where innovation is driven not by governmental bodies, but rather by entrepreneurs and scientists (bottom-up approach). Rodrigues and Melo (2012) also argue that despite the positive contribution of TH model to the quality of policy development, the geographical aspect should be considered in more detail, as regions’ capabilities may differ significantly.

Nevertheless, since its development in late 90ss, the TH regime has received a great social and scholar resonance. The Triple Helix Institute, Association and Conference Series have been established in the United States and worldwide. In Russia the Institute of Innovation within the Tomsk State University of Control Systems and Radioelectronic has set the formation of the TH milieu as its strategic goal and actively works on promotion of UIG interactions in Russia. The Institute has invited H. Etzkowitz in November 2010 to participate in round tables on innovation development in Tomsk and Moscow. As a result of these discussions, the value of the model for analyzing current situation in Russia was emphasized. Moreover, latest book on the TH model had been recently translated into Russian language and was presented by the Prof. Etzkowitz himself. It made the model accessible to a larger audience and fostered increased public attention. In addition, the Future Meetings Committee of the Triple Helix Association has accepted the application by the State Tomsk University (Russia) to host the XII Triple Helix International Conference in 2014.
3.5.2 The Triple Helix model in Russia

Russia, being a country with post-command economy, has developed an unusual structure of UIG interface. Soviet economy was characterized by strong state control and complete dependency on national policies and public budgeting. All types of activities (educational, scientific, innovative and etc.) depended on centralized funding from the government (Dezhina and Kiseleva, 2008). Purely linear model of interaction that existed in USSR (state – industry, state – universities and R&D) made the transfer towards non-linear UIG linkages challenging and time consuming. Consequently, the TH regime in Russia reflects certain particularities.

Currently some elements of the Soviet era are still functioning. Among them one of the most important is the separation between universities and scientific institutions. Unlike western tradition, Russian universities and other HEIs are not the main producers of research, as it is predominantly the responsibility of RAS. However, Ph.D. and Doctorate candidates are educated in universities, where the scientific base is relatively underdeveloped and funding is insufficient. Moreover, students of HEIs find themselves not participating in state-of-the-art research as they obtain their degrees in universities. It entails the shortage of young scientists that are capable of contributing to the country’s development. Ultimately, it creates additional obstacles for cooperation between education, science and industry (ibid). At the same time, RAS focuses mainly on basic research and does not engage in many applied studies. As a result, a substantial segment of scientific activity and potential lags behind.

Apart from stated system’s organizational specifics, another problem occurs: inadequate involvement of industry in research. Dezhina and Kiseleva (2008) point out that participation of businesses in knowledge creation is insufficient. Despite the fact that situation has been improving over the last decade, results still cannot be considered optimistic. Furthermore, mostly large companies participate in R&D activities (particularly, by purchasing former research institutes), while SMEs are left behind (ibid). However, it is the world trend when R&D is mostly concentrated in large multinationals while smaller companies invest insufficiently in research and spend mostly on testing and quality control (Yusuf and Nabeshima, 2007). Subsequently, predominately large firms enjoy outcomes from UI alliances. Russian companies are also not eager to cooperate closely with academia, as they tend to keep their main functions in production and sales. Movement in the opposite direction – from HEIs to industry – is also complicated by academia’s reluctance and lack of entrepreneurial attitude (Dezhina and Zashev, 2007).
Basing on the TH theory and several previous scientific works (Dezhina and Kiseleva’s, 2008; Savitskaya, 2009), the Russian context of the TH regime is graphically depicted in Figure 7 (sizes of the helices and overlapping zones are approximate and only used to show the general image).

**Figure 7. The Triple Helix model in Russia**

Source: based on findings of Dezhina and Kiseleva, 2008

First of all, strong Government-Industry and Government-Science relations are observed only when the state owns the enterprise or when the organization has access to administrative source. Science-Industry interaction is weak due to industry’s insufficient demand for scientific results and dominative role of the government as a customer and sponsor. Traditional differentiation between education and science makes their interaction relatively poor. For Science helix the only working connection is Science-Government interaction, other linkages are unsystematic. Consequently, science appears to be the weakest part of the Russian TH model. As tertiary education is to a great extent funded from the Federal Budget, Government-Higher Education interaction is noticeably strong. U-I relations can be strong in some universities that managed to create tight linkages with industry and attract companies as sponsors and partners. The state solely has the strong connections to every model’s component that reveals its dominant role.

Nevertheless, current tendencies reveal increasing research capacity of universities and closer links between education and science. U-I collaboration is also improving as increases the interest of businesses towards participation in educational programs, projects and research. However, changes have non-systematic character and cannot be generalized due to regional and organizational
differences. Only specially selected universities have opportunities to be more connected to science and industry, while others still do not actively participate in the interaction process. Scientific capabilities of HEIs also differ significantly, partly due to resources allocation system, size and infrastructure. Moreover, reorganization of RAS is required as many unnecessary research units exist. Dezhina and Kiseleva (ibid) conclude that it is necessary to create a more flexible approach to UIG cooperation in Russia.

3.6 Innovation policy and University-Industry-Government relations

As a general rule, innovation depends on the state of economy, education, infrastructure and governance. Countries with developing or transition economies usually suffer to create such favorable environment (World Bank, 2010). In this case, proactive policies and their implications are considered as an effective tool of transformation. At the same time, the World Bank (2010) confirms that to fulfill innovation potential in the knowledge economy, productive UIG relations and a sufficient degree of flexibility within and between institutions are highly recommended.

Relations of academia and industry as well as their participation in innovation occur in a multifarious system. To establish and promote those links governments usually introduce higher education and innovation strategies that regulate a variety of issues. However, despite the diverse nature of U-I interaction, current world policies tend to pay attention to the ones that are directly focused on commercialization (Hughes, 2006). In this category the preference is held by patenting, licensing and spin-off companies. Nonetheless, this issue should be discussed in a broader perspective.

From a common viewpoint, the term policy refers to a guideline, which is used to make decisions and accomplish results. This notion can be applied not only to completed initiatives, but also to a procedure or a protocol (Anderson, 2005). Policy cycle usually includes several stages that may be classified differently. Althaus et al. (2008) list eight major steps: identification, analysis, instrument development, consultation, coordination, decision, implementation and evaluation. A policy is usually introduced by means of written and legitimate documents. Depending on its type it can be created by governmental bodies, private organizations, various groups or individuals.

Public policy is understood as a course of action, regulatory procedures, laws and funding patterns taken by the state with reference to a particular issue (Kilpatrick, 2000). If it is applied to the entire country, the policy can be called national. Those actions are usually communicated through
constitution, legislative acts, judicial decisions or official plans (ibid). Such policies play an important role in economic, social and political spheres, as they provide guidance for the societal development and serve as a coordination base.

Innovation policy is a “public action that influences technical change and other kinds of innovations” (Edquist 1999: 2). It encompasses R&D, technology, infrastructure and education sector and functions within innovation system. Frequently innovation policy is considered to be a part of industrial policy or they are mentioned together. The first one, however, is to a greater extent associated with change, flexibility and future. In its general sense, innovation policy is graphically displayed in Figure 8. As it can be observed, it goes beyond R&D and technology policy.

![Figure 8. Innovation Policy in a Broad Perspective](image)

Source: Jean-François Rischard in World Bank, 2010

Oughton et al. (2002) state that in designing and promoting national innovation policies it is necessary to understand the complexity of UIG relations in NIS concept. They support the idea of system approach that unites public, technology and industrial policies. Oughton et al. (ibid) have indicated the existing paradox between policies and actions of businesses, education and government with reference to R&D issues. They suggest that in order to avoid it, governments have to encourage innovation capacity of regions by increasing public investments as well as boost expenditures on innovation within industrial policy programs.
In order to be efficient, innovation policy needs to reflect general innovation climate in the country and engage many administration units. Moreover, the government has to embrace: (1) verbalization and implementation of innovative projects, (2) provision of financial and industrial support, (3) elimination of obstacles to innovation, (4) development of sound legal and regulatory system, and (5) monitoring and evaluation (World Bank, 2010). At the same time, one should not underestimate organizational challenges that occur in policy formation. For instance, in Russia functions of many RAS units should be re-accessed. They claim to fulfill a particular vital mission while in reality do not produce valuable scientific outcome. In such situations the World Bank recommends to employ innovation policy gradually by small focused reforms that open the door to subsequent institutional changes (World Bank, 2010: 3). Removing obstacles to innovation is another important issue for Russia as it means changing bureaucratic barriers and monopolistic behavior.

The main focus of policies shifts towards advanced links between education, science and businesses since their participation in development grows (Yusuf and Nabeshima, 2007). UIG relations have a strong position in national innovation policies due to a number of factors: (1) they proved to be facilitators of innovations, (2) they may stimulate economic growth and technological development, (3) they unite a variety of people and techniques create a competitive NIS hybrid forms of organizations, (4) during the economic crisis out-of-date structures and linkages entail stagnation, (5) as universities and other actors of the TH regime take additional roles, more thorough attention needs to be paid to oversee and guide their transformed interactions, (6) those links create brand new areas of expertise that facilitates science and personnel advancement, (7) numerous players within the country and globally are involved in this process and it simply cannot be ignored by national policies.

Having this in mind, the support and attention to the UIG interface does not appear as an unexpected phenomenon. For several decades their interaction has been considered by policy makers as crucial for economic development. Prior to the creation of official action courses, relations between academia and industry were yet believed to be an important component of the national welfare. Nowadays UIG linkages are much more institutionalized (Gulbrandsen and Thune, 2010). Numerous organizations are being created to control and foster UIG interaction: business incubators, techno parks, industrial liaison offices and etc. Policy makers actively support the establishment of such institutions as they are able to provide visible results of innovation activities (World Bank, 2010). Institutionalization can also be observed in the formation of research and education centers in so-called “boundary zone” of HEIs, where cross-sector relations and interdisciplinary studies concentrate (Gulbrandsen and Thune, 2010). Due to the high level of practical
applications of such hubs, policy makers reveal an interest in supporting similar UI relations in more traditional settings.

According to Lambert’s report (2003) in order to ensure the productive U-I relations, the regulatory policy should consider the following points: (1) transparency; (2) feasible goals; (3) quality and professionalism of support systems; (4) necessary staff development; (5) defined intellectual property issues; (6) integral databases and information distribution; (7) centralized coordination; and (8) identification of groups of companies and sectors to organize networks and chain organizations.

Moreover, the majority of researchers agree that in order to create a productive and long lasting UI collaboration, mutual benefits gain is essential. For a university the following can be seen of importance: new funding sources, new technologies and practices implementation, additional channels to research results dissemination and higher status among other HEIs. From industry’s perspective: scientific competence in academic environment, access to previous fundamental research, talented researchers and employees, opportunities for further personnel development (through joint lifelong education and executive education programs). Development of mutual trust relationships is another vital point that can be reached through official policies that regulate such collaborations (Abreu et al., 2008).

OECD underlines the importance of well developed government policies in fostering interaction among the NIS actors (2006; 2011). Therefore, a successful innovation policy should be connected to a variety of players in the country as it is pictured in Figure 9.

**Figure 9. Strong innovation policy**

Source: World Bank, 2010
In order to effectively coordinate relations between a diversified actors and activities, innovation policy should be systemic (Pelkonen, 2006). Moreover, as any type of policy, it needs to be appropriately monitored and accessed in the level of NIS and directly the innovation programs and policies (World Bank, 2010). Evaluation of intermediate and final impact of such initiatives is extremely important. Since innovation policy now is considered as a key to country’s development, it is especially of value to register positive and negative fluctuations when the policies are under transformation. It will provide better networking and coordination within the system as well as enhanced correlation of policy aims and societal needs. As a result, nowadays the new variant – a network model – of innovation policy has emerged and is considered of value. It reveals that modern NIS must not only organize different state agencies to promote innovation, but also assist other stakeholders to participate in the policy formation (Figure 10). Smorodinskaya (2011) considers this model as an example of TH interaction type.

Figure 10. Network policy model

IP - Innovation Policy

Source: Anderson et al, 2004 in Smorodinskaya, 2011
4 ANALYTICAL FRAMEWORK

In this chapter the analytical framework of the study will be described. It presents a structure of policy analysis as an approach to investigate how Russian national innovation policies address UIG relations and the Triple Helix model of UIG interaction in particular.

4.1 Policy analysis

Analysis of a *policy* seeks to provide an explanation of its nature, development and performance and frequently refers to the public sector (Bührs and Bartlett, 1993). Methodologically it can use both qualitative and quantitative methods depending on the particular research question(s) addressed. Various scholars develop different stages of such analysis, but typically they encompass problem definition, elaboration of evaluation criteria, alternatives recognition, assessment and best course of actions recommendation.

In the present study the framework of policy analysis is applied for two main reasons. Firstly, the thesis puts its focal point onto innovation *policies* that should be reviewed and evaluated. Secondly, the state actions and their influence on the UIG interaction in Russia are understood as a *policy process*.

As it can be seen from Chapter 3 (Section 3.6), the actual term *policy* may differ widely within and beyond scientific fields. The analysis will be based on Gornitska’s definition of policy being a public course of action that contains an aim and mechanisms for its implementation (1999: 14). Furthermore, hereinafter when spoken of policies, the author refers to statements of the state (namely, governmental bodies) that are documented, officially communicated and related to innovation if not stated otherwise. They can be already functioning or be in the process of developing (for example, published in a form of plans). Several old policies will be mentioned to provide a room for comparison with current practices. Gornitzka (ibid) does not see a need to differentiate policy formation and policy implementation if the analysis is taking place on the national level as its primarily focus should be placed on the policy process.

4.2 Framework of the analysis

While the central theme of the thesis is UIG interaction in Russia, the concept of their relations is examined in the context of national innovation policies and programs. Particularly, policies are not evaluated independently (for instance, in a form of SWOT analysis), but rather investigated with
reference to UIG interface and subsequent changes that they encourage. Since the policy analysis can go beyond the scope of the thesis, specific criteria are required.

As the research focuses on the national level (state innovation policies), Gornitzka’s (1999) model of policy analysis is of importance and can serve as the study’s foundation. In her work she aimed at identifying “how governmental policies and programs have affected the economic policies and programs of universities and colleges” (ibid: 6). The present study will be devoted not to the change within educational institutions themselves, but rather transformations of their relations with industry and government through innovation policies implementation.

In this respect, the idea of collective response that organizations take to face external pressures can be also understood in a broader context. Gornitzka (ibid) speaks about alliances of universities and colleges, which may come together to discuss higher education legislation. Having this in mind, it can be generalized it by considering collaboration of different institutions (businesses, universities, colleges, research units) as the way to enhance their participation in new national programs development and improvement of overall policy climate. Additionally, this process can also go in the opposite direction when government becomes eager to engage with HEIs and industry in the process of productive innovation policies creation to promote whole-country economic growth.

Gornitzka (1999: 17-21) elaborated five key elements that establish a framework for analysis and comparison of state policies: (1) policy problems – main conditions, issues, problems, problem-driven versus solution-driven policy; (2) policy objectives – statement of desired outcomes, policy direction, intended level and breadth of change, innovation versus maintenance, clear versus ambiguous policy; (3) policy normative base – values and beliefs that policy is based on, policy’s ideology; (4) policy instruments – dominant instruments in policy implementation; (5) policy linkage – coherence with other policies and connection to broader trends.

In the present thesis different dimensions of UIG interaction serve as factors to explain policy problems and objectives. The policy normative base of the current study has been already defined in the thesis focal point – interaction between the state, academia and industry. In order to approach policy instruments, Hood’s methodology is be applied (Hood, 1983). He categorized fundamental instruments of governmental control into: nodality (information), treasure (money), authority (legal official power) and organization. Gornitzka (1999) explains them further as: nodality – communication and dissemination of important information (government plays a central role in this process), authority – formal mechanisms of control (by means of public laws), treasure – financial
and other resources that are governmentally controlled, and organization – bureaucracy system (programs and policies implementation and monitoring). In the majority of cases, a policy encompasses several mechanisms simultaneously (for instance, funding is attached to the most of the state’s initiatives). Nevertheless, this classification provides an opportunity to investigate policy instruments in more detail, focusing on the most important issues.

Another important fact is that innovation policy in Russia is currently being transformed. Therefore, performance indicators and evaluation methods are required to explore the dynamics of changes. According to Premfors (1992) policy evaluation and further reformulation constitutes one of the most important parts of policy analysis, as it helps to ascertain potential outcomes and policy’s contribution. Furthermore, the central position in this process takes the consideration of evaluation methods in the policy design. In addition, it is crucial to approach and identify obstacles and challenges on the way of policy implementation process. Therefore, in order to understand the impacts of innovation policy on UIG interaction in Russia, two additional indicators have been added to the Gornitzka’s framework: policy evaluation and policy challenges. The final analytical framework of the thesis consists of six elements that are clarified in Table 2.

Theoretically the study will be guided by the TH model of UIG interaction. It means that the TH concept is considered as a role model or relatively ideal mode of collaboration between the academia, industry and the state. Therefore, while analyzing any aspect of Russian innovation policy with reference to UIG relations, the TH regime will serve as a barometer of advanced, developing, underdeveloped or lacking modes of interaction. As the model underlines the dynamics of UIG linkages, the special attention will be paid to those public policy initiatives that promote the dynamic relations between the three strands. However, presented in the previous chapter specifics of Russian variation of the TH model will be taken into account.

<table>
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<tr>
<th>#</th>
<th>Analysis components</th>
<th>Explanation in the present study</th>
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<tbody>
<tr>
<td>1</td>
<td>Policy problems</td>
<td><strong>Policy problems will address the transforming context of Russian innovation system development.</strong></td>
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<td></td>
<td></td>
<td>What are the conditions for innovation policy creation? What requires to be changed in national innovation policy? What is the rationale of UIG interaction in Russian NIS? What needs the consideration of UIG interaction meets? What is identified by the state as the main innovation policy issue? What is the main policy issue with reference to UIG relations?</td>
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| 2 | Policy objectives | **In order to address innovation policy problem and define policy type, a set of policy objectives should be clearly elaborated.**
What level of essential change is set in the policy? What are the policy purposes? What goals innovation policy is intended to achieve with reference to UIG interaction? What is the action plan for the each participant of UIG interface? |
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<tbody>
<tr>
<td>3</td>
<td>Policy normative base (ideology)</td>
<td>In the present study, the ideology of the policy is established through consideration of UIG relations. As it was stated in the thesis’s aim, policy statements that relate to UIG interaction will be investigated. Therefore, policy normative base is predetermined and will not be further discussed.</td>
</tr>
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</table>
| 4 | Policy instruments | **Considering how and by what means policy objectives will be achieved is a vital issue. It comprises clarification of main policy instruments, including aspects of policy implementation mechanisms.**
What are the main bodies of innovation policy making and implementation? What is the policy instrument mix? What approaches and instruments are attached to the UIG interaction in Russian innovation policy? |
| 5 | Policy linkage | **Policy linkage measures the extent of policy being in line with current governmental policies and broader trends. It also reflects its consistency over time and fields.**
How innovation policy with reference to UIG interaction connected to a variety of other public policies? Does the policy carry on or break previous initiatives? |
| 6 | Policy evaluation | **In order for a policy to be effective in a long-term period, a system of evaluation should be incorporated into it.**
How the evaluation of the degree of success of innovation policies with reference to UIG interaction is designed? What evaluation criteria are developed? How the previous results are taken into account? |
| 7 | Policy challenges | **In the context of the thesis policy challenges reflect problematic zones in innovation policies related to UIG interaction.**
What challenges of innovation policies with reference to UIG exist within the structure of Russian NIS? What issues the state understands as challenges? |
5 INNOVATION SYSTEM AND INNOVATION POLICY IN RUSSIA

In order to better understand specifics of UIG relations in alignment with innovation policy in Russia, the socio-economic background and country’s context will open the chapter. As the UIG interaction process is considered within the framework of the country’s innovation system, the special focus will be placed on the following sections: background of Russia’s innovation system, Russian NIS present condition, NIS governance and national innovation policies.

5.1 Introduction to the context

Russia, the largest country in the world, is characterized by Sala-i-Martin (2009) as one of the biggest developing economies according to the gross market value. It belongs to the BRICS countries – world leading emerging economies. Russia’s population makes up to 141.9 million people (Federal State Statistics Service, 2011). Most of it is concentrated in European part. The World Bank characterizes Russia as a middle income country (GDP per capita was 8,684 USD in 2009), which economy is mostly based on oil, gas, mining and metallurgy (ERA Watch, 2011).

Over several last decades Russia has experienced a wide range of drastic transformations. The shift from command-administrative to market economy in early 90ss affected all national systems, including innovation and higher education. Linear mechanisms of interaction within the state were changed as well as new players – market and private organizations – appeared. It forced Russia to restructure methods of steering and start developing new policy instruments in order to successfully compete in the modern milieu. Current Russian economic and innovation system is based on former USSR structure. The Soviet era was characterized by total concentration of all sectors around state’s strategic orders. Exceptional importance was placed on space, nuclear and defense programs. It has created a system where consumer’s demand for modernizations was unaccounted or resulted in unsatisfactory results (for example, in automobile and consumer goods industries).

Despite the fact that now the country’s economy is continuously growing, existing NIS is still poorly developed and functions not efficiently. It is mainly based on foreign technologies with as low as 1% of GDP spent on fundamental and applied research (0.7% from Federal Budget and 0.3% from businesses). In a variety of rankings Russia is placed below developed countries (Chubais, 2011). Those factors highlight the need of NIS restructuring in order to improve Russia’s
performance in the world innovation system as well as create decent welfare conditions in the country.

Severe transformations have also occurred in Russian higher education system. In Soviet times tertiary education was free of charge for students and funded completely from the Federal Budget. In the 90ss along with the emergence of private HEIs, tuition-based places have been introduced in all state universities. New opportunities for additional (tuition-related) profit have resulted in a rapid increase in number of HEIs and degree programs. Another reason for that was the attempt to follow the market demands: given the country’s structural changes, there was a need for new types of specialists in various fields.

Currently Russia still endures significant changes, among which of our particular attention in this research is creation of new governmental procedures and institutional forms. However, Sala-i-Martin (2009) point out that recent fairly steady oil profits have increased stability in the country. It allowed Russian government developing several mechanisms to foster economic growth, improve human rights protection and diminish corruption. Yet positive results that are officially published frequently do not reflect the real picture of existing problems, such as flourishing bureaucracy and ambiguous legislation.

In 2008 D. Medvedev as the President of Russia stated innovation as a national priority. He pointed out that “we have to be at the cutting edge of innovations in all key sectors of economy and social life” (from his message to the Russian Federation (RF) Council (Sovet Federatsii), 2008). Improvement of NIS constantly remains on the national agenda. After Russian presidential elections of 2012, the state policy’s focal point on innovation has not been altered. However, in spite of the nationally set direction, actual demand for innovations in Russia stays exceptionally low. Experts link this phenomenon to the insufficient development of market mechanisms (Dezhina, 2011).

Apart from the inadequate participation in innovation activity, Russian economy faces another problem – demographical decline. Consequently, country needs to ensure not only effective governmental policy to expand outside the energy, oil and gas sectors, but also sufficient skilled labor force (Russia country report, 2010). It can be a challenging task due to inadequate salaries of researchers that makes this profession not popular among talented youth, results in brain drain and, in the long run, hampers economic development.
Nevertheless, Russia has some competitive advantages comparing to other countries: rich natural resources, intellectual capital, high level of education, long-standing scientific and engineering culture, several world class science and technology centers. Moreover, over the last two years, Russian government has started a number of potentially fruitful national programs to stimulate innovation and diverge from resources-oriented economy (Dezhina, 2011). Undoubtedly, there is still a long way to achieve high level of economic development. Following the study’s framework, a more precise look on Russia’s innovation system will be provided below.

5.2 Russian innovation system: background and present

The system of innovation, being a part of a larger socio-economic system, is shaped by a variety of factors that differ in every country. It was repeatedly proved by the experience of developed economies that its adequate condition is a prerequisite for technological evolution, prosperity and global competitiveness. Worldwide innovation sector’s advancement started to be considered as a key factor in promoting progress in 1980s. Subsequently, in 1990s changes in science and technology (S&T) in developed countries provided an impetus to economic growth and knowledge intensive production. At this time Russia has entered the protracted transformation period (Gurieva, 2002) fairly recently.

A. Chubais, former Prime Minister of Russia and current Chief Executive Officer and Chairman of the Executive Board at RUSNANO, in his recent presentation underlined three major stages of Russian economy development (2012):

1. 1990-2000 – establishment of Russian market economy foundations;
2. 2001-2010 – economic growth based on oil and gas export;

Creation of Russian NIS started right after the collapse of USSR, but took its present form a decade later when the Board for Science and High Technology by the President of Russia state, a consulting body by the President, was founded (Gurieva 2002). This initiative was introduced in 2001 by V. Putin with an aim of guiding the country in innovation policy development. Two years later the first policy document related to innovation “On Framework for Policy of the RF in the Field of Science and Technology for the Period till 2010 and Future Perspective” was passed. Its long-term objective was formation of an efficient innovation system in Russia.
However, Dezhina (2004) underlines that, despite proactive approach of the state, even in 2003 the country still considerably lagged behind. At that point, Russia’s science intensive product ranged only from 0.35% to 1% (ibid). Proportion of patents, licenses and know-how was also as low as 3% and 7% of national export and import respectively. Additionally, the amount of innovative enterprises in Russia made up considerable lower share than in Europe and USA (Savitskaya, 2009).

One important comment should be made at this point. The effectiveness of any NIS is usually measured through innovative performance of enterprises. It can be explained by taking into account the overall importance of businesses in building innovation structures (e.g. in Edquist, 2005). In fact, innovation activity of enterprises in Russia has remained fairly low: organizations with technological innovations composed only 9.4% in 2007, 9.6% in 2008 and 9.4% in 2009 (ROSSTAT, Russia in figures, 2011). Despite the fact that this indicator shows important tendencies, nowadays the level of universities’ participation in innovation is also been assessed as crucial (Etzkowitz, 2008).

Given the long history of having a command structure, Russia has developed innovation system remarkably different from European and American models (Gaponenko, 1997). Mainly it is accounted for the Soviet time lasted more than 70 years and characterized by severe authority control: national monopoly on foreign trade, domination of state industrial corporations, no independence on innovation activities, prohibition of own business creation, total state’s control over science and education. The Soviet government set obligatory amounts of specialists required in every field, hence, directed the labor market and ignored mechanisms of supply and demand. Predictably, transition from such distinctive system has influenced all sectors of the national economy and welfare (Gurieva, 2002).

Soviet legacy can be easily found in current innovation structures. As an illustration, Russian state still owns major scientific institutions and provides substantial funding for education and S&T sector. At the same time, innovative SMEs, infrastructure and policies are being established to foster crucial transformations (Dezhina and Zashev, 2007). While analyzing Russia’s NIS, one should also keep in mind an uneven development of different country’s regions: The country has created NIS concentrated in center area (Moscow, St. Petersburg) with the share of over 50% from all national innovation activity (EraWatch, 2011). There are only some regions that managed to develop sound innovation policies (for example, Tomsk, Tatarstan), but such examples are not widespread. Thus, Russia’s NIS can be described as transitional: old elements of the USSR period coexist with new, originated from market approach.
Main subjects of Russia’s NIS include: R&D system, institutions that use technological innovations, innovation policy formation and evaluation organizations or departments, innovation infrastructure and supporting institutions. These elements operate within a specific environment created by market needs, macroeconomic policy, labor market trends and other factors. In 2006 OECD has provided a comprehensive depiction of Russian NIS. With some amendments, it presumed its general shape until present time. Basing on this data, the detailed scheme of Russian NIS can be found in Figure 11. In the present study the focus will be placed on the governmental level to analyze how the state supports and coordinates other actors of innovation system by means of innovation policy.
Figure 11. Russian innovation system

Source: OECD, 2006 in Peltola, 2008

45
5.2.1 Strengths and weaknesses of Russian National Innovation System

Russian NIS has been studied by several research groups over the last decades (OECD, Guinet, Dezhina, Demchenko, Golichenko and others). Synthesized advantages and disadvantages of the current innovation system in the country are presented in Table 3 (items are listed not in order of importance or intensity).

**Table 3. Summary of Russia’s NIS strengths and weaknesses**

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Strengths</th>
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<tbody>
<tr>
<td>Low legislative activity, overlapping and competing policies, contradiction between municipal and national legislation;</td>
<td>Generous possession of natural resources;</td>
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<td>The lack of property rights on scientific projects financed by the state;</td>
<td>Considerable intellectual capital;</td>
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<td>Low salaries in education and R&amp;D sector;</td>
<td>Strong positions or leadership in some areas of fundamental science;</td>
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<tr>
<td>Inadequate interconnections within NIS;</td>
<td>Developed system of R&amp;D institutes (created as a part of Soviet and later Russian Academy of Science);</td>
</tr>
<tr>
<td>Underdeveloped bank loans system and high export and import taxes;</td>
<td>Strong positions in the world market in such technological areas as aerospace, industry, metallurgy and energy;</td>
</tr>
<tr>
<td>Poor infrastructure for innovation activity and uneven development of telecommunications;</td>
<td>Improving positions of higher education sector;</td>
</tr>
<tr>
<td>Underdeveloped technology transfer institutes;</td>
<td>Relatively high employment rate in science and technology sectors;</td>
</tr>
<tr>
<td>Lack of long-term industrial policy aimed at producing competitive products;</td>
<td>Long-standing scientific and engineering culture;</td>
</tr>
<tr>
<td>Scarcity of high quality specialists to manage innovation processes (especially among civil servants);</td>
<td>An increasing number of firms including the ones capable of seizing new market opportunities through innovation;</td>
</tr>
<tr>
<td>Constant reforms in ministries’ structures with no visible results;</td>
<td>Innovation infrastructure is rapidly developing;</td>
</tr>
<tr>
<td>The governance system lacks productive monitoring and evaluation of state initiatives;</td>
<td>Constant attention of the state towards NIS, innovation policy, SMEs, R&amp;D development;</td>
</tr>
<tr>
<td>Science is excessively concentrated in big scientific and industrial centers;</td>
<td>The state’s ability to mobilize resources in priority areas;</td>
</tr>
<tr>
<td>Irrelevant parts exist in the public research system;</td>
<td>Accumulated experience in designing and using different innovation policy tools;</td>
</tr>
<tr>
<td>Traditions of Russian business and corruption;</td>
<td>Scientific work becomes more prestigious.</td>
</tr>
<tr>
<td>Unfavorable climate for SMEs in regions;</td>
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Scientists and practitioners consider one of the weakest parts of Russian NIS the lack (or, in some cases, severe underdevelopment) of productive, transparent and diverse links between the state, higher education, science and industry that function in the “no corruption” environment (the Concept, 2008). It was already mentioned the existing separation between HEIs and science that distinguishes Russia from other countries and creates additional barriers to UIG interaction and knowledge and human capital transfer. Aleshin (ibid) concludes that only balanced reformation of the state policies and institutions would guide the country towards economic growth.

At this point, the importance of evaluation and monitoring of all innovation activities and policies should be stressed. In order to develop advanced NIS, it is necessary to register positive changes and support them as well as modify unsuccessful or destructive initiatives. There are many examples of successful actions in Russia, but many of them pass unnoticed due to the lack of evaluation (Dezhina, 2011). Therefore, an increased attention is needed towards the analysis and further application of constructive experiences.

To conclude, Russia’s NIS particularities and shortcomings are systemic, which requires comprehensive reformation to create new conditions for innovation. Therefore, small amendments and unstructured policies should be substituted by the national innovation policy model that will encompass all governmental initiatives (Gokhberg, 2010). Formation of comprehensive legal framework system should be a first vital step in this process.

5.2.2 Legal framework

One of the indicators of effective NIS is its institutional and legislative foundation. Most advanced countries have created successful legal systems to manage innovations. For instance, in the UK, despite the absence of one centralized controlling body in charge of innovation, a special synergy mechanism coordinates policy creation on the national level. The U.S. has developed a different structure based on well-designed legislation supported by numerous laws and decrees that regulate innovation sphere. It is an expected fact since the country has considered innovation sector as a high national priority starting from 1980ss (Mamedov, 2009). Russian system, on the contrary, suffers from insufficient regulation of innovation activity. At present time the state’s legislation functions within economic legal framework through the system of enforceable enactments. Several major points will be further emphasized.
First of all, one of the initial decrees with reference to innovation is the Federal Law “On Science and State Science and Technology Policy” (127-FZ, 1996) aimed at coordinating scientific and technological sectors. Secondly, NIS legal framework is based on intellectual property legislation: the item 71 of the RF Constitution, special laws that define the legal status of inventions, utility models, industrial designs, computer programs and databases, trademarks and etc. Thirdly, Russian innovation sector is regulated by international agreements, e.g. the Paris Convention for the Protection of Industrial Property, Eurasian Patent Convention and other. And finally, there are subordinate acts of different origin that cover particular aspects. For instance, following the initiative of the President of Russia in 1998, the Main Directions of the State Policy Concerning Increasing Application of Results from the Scientific and Technological Activity (1607-p, 2001) were adopted.

After that the State Duma (lower house of Russian government) has passed several federal laws with reference to science and innovation, among them: “On a Patent Agents” (316-FZ, 2008), “On the Kurchatovskiy National Research Institute (220-FZ, 2010), “On innovation center «Skolkovo»” (44-FZ, 2010) and etc. A principally different federal law on U-I cooperation (217-FZ) was introduced in 2009. It has enabled establishment of spin-offs jointly by businesses and universities and created additional opportunities for productive cooperation between education sector and companies. For HEIs it was an important step to commercialization of their scientific results.

Experts point out that the main problem of Russian legislation is that many policy documents still do not include feasible mechanisms of enhancing innovation activity (Mamedov, 2009). This phenomenon can be explained by different reasons, namely: (1) excessive reliance on western experiences that are not always applicable to Russia, (2) hectic approach to policy implementation, lacking correlation with existing records, (3) absence of necessary basics (clear definitions, responsibilities, structure). Another visible Russia’s particularity is a substantial difference between regional and national legislation. In Russian regions over 400 legally enforceable enactments contain explanations of innovation activity or innovation policy (Mamedov, 2009). More than 50 constituents of the RF have adopted such laws (Todosiychuk, 2011). Thus, there is a clear necessity for a federal consolidated decree on innovation activity that will encompass a whole variety of issues. Moreover, formation of functional legal base is only possible when it is connected with legislation in other spheres: anti-monopoly, property, land laws, customs regulations and other significant acts. It allows avoiding antinomies, loopholes and ambiguity.

5.3 Role of government

Over the period of 2002-2012 the state took an active role in NIS reformation: several basic policy documents on innovation were created, new governmental policies to support interactions within NIS were launched, and amendments to previously existed records were made. Governmental awareness of changes’ necessity can be considered as a positive factor in building national innovation policy. At the same time, experts reveal still a large share of governmental participation in NIS and they do not predict its reduction in following years (Savitskaya, 2009).

The proactive approach of Russian government in NIS creation has been frequently considered excessive and, subsequently, criticized as the factor of its slow development. The necessity to reduce the amount of state’s actions in the innovation sector has been emphasized (for example, in OECD, 2010a; 2011). As a result, international community formulated strong recommendations of relinquishing governmental control of manufacturing and innovations and sharing responsibilities with the private segment in Russia.

However, some authors argue that it is only the surface vision based on western experiences, which cannot be always applicable to Russia. For example, Aldoshin (2009) is assured that foreign experts are not completely aware of Russian social, economic and political realities. Among crucial particularities he mentions: (1) totally different nature of Russian business, and (2) a unique structure of relationships between businesses and authority. Companies operate in a situation of corruption, vague legislation and a high level of uncertainty. Additionally, OECD (2010a) concludes that not only creative individuals and businesses, but also the government is a key player in innovation process as it creates necessary framework for innovation and protects the system from market failures.

5.4 National innovation policies

Within the framework of NIS the development of national innovation policy has a strategic priority. It is a core mechanism in fostering structural changes in both developed and developing countries (Gurieva, 2002). Despite the fact that this issue has been on the agenda for more than a decade now, Russia still has not created an integrated innovation policy.
According to OECD research (2011: 182), there has been three main stages in Russian innovations policy formation: (1) chaotic restructuring and introducing new policy approaches (from the USSR collapse until the late 1990ss), (2) relative stabilization, development and adjustment of the innovation policy framework (from around 1999 until mid-2000ss), (3) consolidation and expansion of the innovation policy framework (until present moment).

Basics of Russian innovation policy were formulated in the mid-1990ss through the initial federal law “On Science and State S&T Policy” (1996). The State functioned in a situation when the institutional and instrumental changes were necessary. It was especially crucial for science, which was in major crisis (2009). Previously there were several legislative acts, initiatives and organizations that mentioned stimulation of innovation activities among their objectives, such as the Patent Law of the RF (1992), the Law on Intellectual Property (1993), SMEs Assistance Fund. However, they have not been united in one system with common goals. One of the reasons why the innovation policy could not be created in early 1990ss was the required revision of legislation to frame and guide the innovation sector of the economy.

The first discussions over national innovation policy took place in 1997-1998 together with efforts to formulate the actual course of action for the state. Its first version was elaborated by the State Duma in 1999, but was evaluated as of poor quality and finally approved only in 2002 by the President V. Putin. The reason for its correction was the lack of clear definitions and vague description of infrastructure. Importantly, the first document was prepared without participation of leading scientists and industry experts that, eventually, downgraded its value. Later in 2002 the President announced main goals for Russian policy in S&T, which included the transition from natural resources based towards the innovation driven development. It entailed the formation of the Policy of S&T Development until 2010, elaborated by the Council of Science and High Technology.

Development of Russian innovation policy was also going in line with organizational changes and creation of new bodies to oversee the process. In 2005 the Investment Fund for Technologies and Innovations was established with 100 million USD of financial resources (75% of that was covered by Federal Budget). Additionally, various laws’ amendments have been made, including, granting VAT benefits to institutions involved in innovation activity. However, despite multiple changes, economic indicators have reflected not sufficient level of Russian NIS development. Having in mind that Russian innovation policy is the first of its kind in the country, evaluation of its outcomes is realistic starting only from 2010 (Savitskaya, 2009).
Recent years have been devoted to important national reforms (for the most part long-term). In 2009 the President of Russia together with the Commission on Modernization and Technological Development of the Economy have identified national science and technology priority areas for modernizing Russian economy: (1) energy efficiency and energy saving, including alternative fuels, (2) nuclear technologies, (3) space technologies, especially related to telecommunication, (4) medical technologies, (5) information technologies, including supercomputers. The special status was also granted to nanotechnology as one of the most prospective scientific fields in Russia (Koponen 2009). Furthermore, Russian government has initiated several large-scale projects and programs targeted on development of innovation activities in a variety of sectors. Amongst them there are several crucial to be mentioned in the context of the thesis.

Completed:

- Federal Target Program "Integration of Science and Higher Education in Russia" (2002-2006).

Current:

- National priority project “On education” (launched in 2005). It aims at modernization of Russian education, ensuring its proper quality and relevance.
- National research universities (initiated in 2008). The project’s goal is to select best Russian universities to be the centers of education and science integration. Up to this point 27 HEIs across country have been ranked top quality and accomplished the title of national research institutions. The project’s long-term goal is to create top class universities capable of doing competitive research.
- Attraction of the leading scientists to Russia (launched in 2010). The government has initiated competition for mega grants (up to 150 million rubles) available for state-of-the-art research projects of prominent scientists in selected areas.
- Project on improving cooperation between universities and industrial companies (launched in 2010). It aims at increasing the state support for HEIs and industry interaction and advancement of high-technology production.
- Development of innovative infrastructure (initiated in 2010) in a form of open
competition for up to three years of the state financial support.

- A set of infrastructure supporting projects – Special Economic Zones (SEZs), Technology Platforms, Skolkovo Innovation Center, Scientific Cities (this point will be discussed in detail in the next chapter).

In 2010 the strategy for Russia’s innovation progress was prepared by the Ministry for Economic Development. It aims at increasing country’s intellectual potential, businesses participation in innovation and integration into the global system. The Strategy covers the period until 2020 and has two main stages:

1. 2011-2013: enhancing investments into high-technology sectors, attracting of highly qualified human resources to S&T, introducing balanced system of tax benefits and financial support mechanisms, elimination of unsustainable scientific organizations.
2. 2014-2020: increasing the share of private funding for R&D, ensuring the rise of funding for education, science and infrastructure renovation.

5.5 Innovation policies in times of crisis

Innovation sector becomes really vulnerable in times of crisis as it is considered as “additional” segment. Consequently, it suffers from financial cutbacks and organizational modifications. Russia is not an exception. One of the alarming indicators of the economic crisis influence on Russian NIS was the substantial decrease in expenditures for R&D of private companies. All types of companies have reconsidered their participation in R&D activities, including both internal and outsourcing offices. At the same time, banks became unwilling to provide innovative SMEs with loans that have led to decline in their number. Government has also cut investments in R&D starting from 15% to sometimes 30% depending on the program (Dezhina, 2009). This measures are rather opposite for anti-crisis actions in Europe and the U.S. There, on the contrary, crisis expenditures on innovations have been increased in order to ensure long-term results.

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4 The Strategy of the RF Innovative Development Until 2020
It can be concluded that Russian government chooses measures that provide immediate results without proper evaluation of their strategic consequences. The state’s policy is focused on more efficient use of given resources instead of developing new mechanisms. The strategy is continually centered on SMEs and start-ups as a way to build up industry’s interest in R&D. However, there are alarming concerns that numerous anti-crisis programs developed by the government will be inefficient due to the lack of support for technology renovation, product diversification and proper competitive environment (ibid). Therefore, it may be seen as a delay in an advanced NIS development in Russia.
6 UNIVERSITY-INDUSTRY-GOVERNMENT INTERACTION IN RUSSIAN INNOVATION POLICIES

As it can be observed, the issue of UIG interactions in Russian innovation policies has been gradually developed in the thesis following research questions addressed. Firstly, background of the topic was investigated and suitable methodology was identified. Then previous studies on the subject were reviewed in order to create theoretical and analytical frameworks. After that, national innovation system and innovation policy in Russia was explored to overview researched context in detail. And finally, the final point of the thesis stated in its title is to investigate how UIG interaction is addressed by Russian innovation policies. According to the analytical framework this question will be elaborated in six dimensions: (1) policy problems, (2) policy objectives, (3) policy instruments, (4) policy linkage, (5) policy evaluation, and (6) policy challenges.

6.1 Policy problem

After the collapse of the USSR in 1991, the country has experienced drastic political and economic transformations. The shift towards market economy required development of related legal and institutional structures. New government had to adjust to the changed environment and introduce subsequent directions of public policy. International conditions for Russian economy and NIS have also been changing: (1) worldwide accelerated technology has brought into competition not only developed countries, but also rapidly developing nation states (for example, the Commonwealth of Independent States (CIS)); (2) technological revolution towards cost-effective usage of resources and renewable energy has created an uncertain future for Russian economy which depends on oil and gas; and (3) a number of world-wide challenges, such as climate change, aging of population, ecology issues (the Strategy, 2010). Global rapid technological advancement based on competitive innovation systems has become an impetus for evolution of Russian NIS. OECD research (2009, 2011) confirms that existing gap between Russia and developed countries can be overcome only by means of constant innovation.

From the beginning of the last century a number of Russia’s national projects have achieved their main goals: the economic growth is steady and foundations for structural and institutional reforms are built. However, in order to solve the upcoming problems, more long-term and holistic solutions should be rapidly introduced (the Concept, 2008). In 2000 Russian state’s special attention was paid to S&T policy development as the first step in moving away from the natural resources dependency.
Five years later the focus was altered from solely S&T to a broader framework of innovation policy (Gijsbers and Roseboom, 2006). However, it is essential to reiterate that there is still no national law entirely devoted to innovation. The sector is controlled by several policy documents that can be divided into key and supportive.

Proper functioning of innovation system cannot be ensured by the state alone, as its precondition is the strong linkages between government, industry and universities. In Russia the balance of competition and cooperation between NIS actors is underdeveloped, which means that different elements operate separately, being seldom engaged in productive relations (Golichenko, 2007). Insufficient level of UIG interaction distinguishes Russia from the countries with advanced systems of innovation at first created a sound public-private partnerships and technology transfer mechanisms. However, Russian government has already communicated the necessity of the comprehensive innovation policy to regulate and encourage innovation activity as well as explicitly depict interactions between NIS actors (the Concept, 2008). The principle of equal state-private partnerships and integration of efforts and resources towards upgrading country’s innovation sector is also clearly conveyed in the Main Directions (2006). Thus, Russian innovation policy underlines the importance of sound innovation system development, particularly, based on productive cooperation between its components. It can be noted that statements of key innovation policies encompass the idea of the TH model, where all the actors of NIS should be interconnected and work for the same goal – country’s economic and innovative advancement.

The central place of the state in UIG interface is legally defined: it functions as the main executing force and an implementer of necessary changes. According to the Concept (2008), government not only initiates this process, but also oversees fulfillment of all obligations. If position of the state is strong, its intervention will activate long-term innovation projects built on effective interface between NIS actors (Gokhberg, 2010). However, if the state’s power is compromised by, for instance, corruption, transformations may be noticeably delayed. Moreover, conflict of authority creates additional obstacles. In Russia there are numerous controlling bodies at national, regional and municipal levels claiming to influence innovation system. Consequently, policies are frequently non-consensual and uncoordinated which leads to confusion. Therefore, it can be concluded that the Russian reality of interactions between academia, industry and the state, is still very much dominated by the latter one, which proves that it is fairly far from the TH regime. As this phenomenon is reflected in policies and legal enforcements, UIG relations in Russia can (and do) suffer from such an unbalanced structure.
Moreover, given the degree of the state’s attention towards innovation policy and substantial investments to S&T, the country still considerably lags behind the world leaders in technological development. Experts define as a key problem of Russian NIS the low demand for innovations in Russian economy. In 2010 V. Putin, as the Head of Russian Government, in his speech underlined that there are few truly innovative initiatives and organizations in Russia. As an illustration, in 2010 the share of Russian science-intensive products and services was as low as 0,3% – 0,5% (to compare with 36% in USA, 30% in Japan and 17% in Germany). The export level of high-technology production was not higher than 5 %, whereas in China this indicator makes up to 22,4%, South Korea – 38,4%, Hungary – 25,2% (the Strategy, 2010).

Another problem of Russian NIS is weak UIG interactions that impede knowledge and technology transfer. Education and science are, for the most part, separated from each other, overloaded with bureaucratic procedures and intensively controlled by the state. Industry and entrepreneurial sector do not reveal noticeable interest in innovation and science despite the severe drop of their competitiveness on global and local markets. Furthermore, Russian alarming particularity is indifference of entrepreneurs in financing scientific sector that leaves the Federal Budget as the main sponsor of S&T in Russia (Litvintseva, 2011). All these issues hamper innovation-based economy development. It also can be explained from the TH theory – the lack of strong interconnections between all elements of an innovation system slows down the overall national economic growth.

In 2010 Russia’s focus on sustainable development based on innovation and modern technology was declared. Importantly, V. Putin emphasized, that fundamental steps should be made in order to improve interaction mechanisms between governmental units (ministries, commissions, federal agencies, departments and etc.), scientific and educational institutions, and industry. The Strategy (2010) also states that mutual vision and collaboration between the members of Russian NIS is one of the prerequisites of economic growth. It refers to the joint efforts of business, science, civil society and the state in reaching common objectives (ibid). A. Uvarov, Vice Rector of TUSUR, has highlighted that those interactions are getting closer to the third modification of the TH model (2010, interview). Nevertheless, taking into account current innovation policies related to UIG relations and the results of already implemented projects, Russia still has a long way towards the most productive variation of the TH model (TH III).
To conclude, changed internal and external conditions for Russia have stressed not only the necessity to promote innovation and develop strong NIS, but also to improve existing UIG relations. Innovation policy is now seen as a course of action that should encompass science, education, technology and entrepreneurship and be a part of the global innovation system. Dezhina also states that “the degree and quality of UIG interactions to a great extent depends on the fundamental principles of national innovation policy that state is conducting at that moment” (2009: 75). It is important to note, that currently UIG interactions in Russia are being facilitated by the increased attention towards the issue of their importance in policies. Moreover, experts from different fields are attracted towards innovation policy development that may positively affect quality of produced courses of actions. Nevertheless, there is a considerable number of policy obstacles that exist in Russia, but this issue will be discussed further in Section 6.6.

6.2 Policy objective

As it can be seen from previous chapters, strong UIG interactions are crucial for an advanced innovation system. Authors of the TH model also stress that country’s innovative development to a great extent depends on the quality of those linkages (Etzkowitz, 2008). In order to build up such productive interface, straightforward and specific objectives should be elaborated in relevant policies. In this respect Russian policy makers have set several strategic goals to be reached by 2013 (first stage), 2020 (second stage) and 2030 (advancement stage).

Russia’s current innovation policy can be generally characterized as promoting change in existing practices and, to some extent, maintaining a number of initiatives introduced in previous policy versions. At the same time, it is constantly being emphasized that crucial transformations ought to be made in Russian NIS to accomplish ambitious policy plans (the Strategy, the Concept, Dezhina, Uvarov and etc.). Required changes are systemic in nature and should be implemented throughout the country. In order for a reader to have a clearer vision, initial focus will be placed on the major aims and then, specific objectives with reference to UIG interactions will be discussed.

The major innovation policy’s goal is to develop innovation-based economy in Russia by year 2020. To achieve it, the following objectives have been set: (1) technological leadership through competitive economic growth and constant technology modernization in key sectors; (2) life quality improvement; (3) ensuring openness of Russian economy and NIS; (4) creation of fruitful economic conditions for innovative production in line with national strategic priorities; (5) enhancement of business innovation activity; (5) development of R&D sector and improvement of knowledge
commercialization process; (6) integration of Russian NIS into the global innovation system; (7) ensuring special conditions for collaborative work of different actors of NIS on strategically important projects (the Concept, 2008; the Strategy, 2010).

Russian innovation policy is aimed at boosting cooperation between scientific, educational and industrial institutes. Both policy documents and field interviews confirm that to accomplish specified goals, Russia should establish multilateral interaction within NIS. According to the Strategy (2010), it will entail an extensive increase of Russian economy’s competitiveness. There are several tasks that are defined in order to the UIG interface shifting towards the third mode of the TH III system:

- to introduce new instruments of the state’s support in creation of UIG linkages oriented on serial production and implementation of innovations;
- to integrate high-technology SMEs into interface of Russian NIS;
- to ensure efficient private-public partnerships on innovation projects of strategic importance;
- to create an integrated milieu for higher education and science that will stimulate cross-disciplinary and intersectorial cooperation;
- to attract Russian and international private and venture investments to knowledge-intensive industries and high-technology sectors of the economy.

Within the framework of innovation policy Russian authorities are inclined to the creation of mutually advantageous partnerships between governmental system, academia and industry. As known from the TH theory, the more these strands are engaged in joint activities, the closer country’s economy is to innovation-based type. Therefore, distinguishing policy aims with reference to each major player of Russia’s NIS can bring additional insights into the research. Indisputably, every stated below initiative affects more than one box. However, this approach provides an overview of the direction in which innovation policy is guiding Russian TH structure (Table 4).
Table 4. Innovation policy objectives

<table>
<thead>
<tr>
<th>Government</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>• to define priorities in innovation activity</td>
<td>• to develop in HEIs jointly with the state and industry competences necessary for innovation activities</td>
</tr>
<tr>
<td>• to ensure proper legal and regulatory framework for innovation and interaction of NIS actors</td>
<td>• to integrate HEIs and science</td>
</tr>
<tr>
<td>• to create favorable climate and infrastructure to promote UI cooperation</td>
<td>• to engage professors and graduate students in scientific projects in priority areas</td>
</tr>
<tr>
<td>• to balance NIS funding mechanisms</td>
<td>• to create university departments in companies</td>
</tr>
<tr>
<td>• to increase state regulation of S&amp;T and R&amp;D in commercially viable sectors</td>
<td>• to develop innovation management programs for Russia’s NIS administration</td>
</tr>
<tr>
<td>• to decrease or eliminate irrelevant support</td>
<td>• to introduce joint [with companies] curricula development and management of HEIs</td>
</tr>
<tr>
<td>• to reduce administrative barriers</td>
<td>• to promote lifelong learning</td>
</tr>
<tr>
<td>• to distribute information on innovation and integrate it into national culture</td>
<td></td>
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</tbody>
</table>

Science

<table>
<thead>
<tr>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>• to develop Russian scientific excellence in priority areas</td>
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<tr>
<td>• to develop strong links with HEIs</td>
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<tr>
<td>• to ensure development of human resources capacity of science</td>
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<tr>
<td>• to develop continuity in Russian S&amp;T sector</td>
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<tr>
<td>• to enhance technology commercialization</td>
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<tr>
<td>• to promote closer ties with HEIs</td>
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<tr>
<td>• to establish specialized laboratories in universities</td>
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<tr>
<td>• to enhance industrial attention towards financing S&amp;T and innovations</td>
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<tr>
<td>• to improve company-based education and personnel retraining in cooperation with leading HEIs</td>
</tr>
<tr>
<td>• to increase production of R&amp;D within companies</td>
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<tr>
<td>• to allow professional mobility</td>
</tr>
</tbody>
</table>

As it can be seen from Table 4, there are some dynamics that is bringing universities, scientific units, industry and government closer to each other. However, Dezhina (2011) expresses some concerns due to several vaguely communicated goals. Moreover, crisis of 2008-2009 has postponed achievement of policy objectives and delayed the development of Russian innovation system. It also decreased already low private expenditures on innovation. Additionally, the post-crises economic recovery is conducted under condition of amplified internal and external pressures. Nevertheless, the Strategy (2010) defines this situation as a short-time and states that it will not entail reconsideration of strategic goals. It has only created additional challenges towards the pace and quality of projects to be implemented until 2020.
6.3 Policy instruments

In order to reach stated objectives, innovation policy should possess clearly defined instruments. At the outset, policy maker and policy implementer are crucial to be distinguished in governance structure of Russian NIS. Then, following the analytical framework, mechanisms of policy implementation as well as approaches of innovation policy towards the development of UIG interactions should be defined.

6.3.1 Russian NIS governance structure

The structure of managing innovation system includes a variety of governmental bodies and administrative authorities at federal and regional levels. The governance system of Russian NIS has experienced a number of transformations since the beginning of the XXI century. Organizationally it is divided into two branches: executive and legislative.

Executive branch is managed by the President and the Prime Minister and coordinates activities related to science, education and innovation through several federal organizations that historically fulfill different tasks (OECD, 2011; Peltola, 2008). It consists of the following bodies:

- **policy making and coordination** (Ministry of Education and Science, Ministry of Economic Development, Ministry of Industry and Trade, Ministry of Information Technologies and Communication, Ministry of Energy, Federal Agency for Science and Innovation, RAS and Russian Space Agency);
- **coordination of financial aspects** (Russian Foundation for Basic Research, Russian Foundation for Humanities and Foundation for Assistance to Small Innovative Enterprises);

Legislative branch is managed by the State Duma and the Federal Assembly. The State Duma consists of several committees related to innovation policy that participate in discussions on laws revision and priorities (for example, it has created the list of critical technologies). The Federal Assembly is in charge of policy monitoring and federal plans creation by means of expert panel discussions. It encompasses Committee on Science, Education, Health and Ecology, Committee on Industrial Policy and Committee on Information Policy.
Principally there are two levels in Russian NIS governance: (1) *policy guidance and direction* (the top bodies form legislative and executive branches) and (2) *policy formation and implementation* (ministries, agencies and other structures). Further, the structure continuities at regional and municipal level, but this issue goes beyond the thesis’s scope. The graphical representation of the governance system can be seen in Figure 12.
Figure 12. Governance of Russian NIS

Source: OECD, 2011
6.3.2 Policy implementation: main actors and mechanisms

There are several governmental actors in innovation policy implementation and distribution of funding as one of the main instruments on the state’s disposal (the Strategy, 2010). Creation of such bodies has been accessed by EraWatch (2011) as a big step towards competitive allocation of funds for innovations in Russia.

Since the President and the Prime Minister prepare strategic decisions on innovation policy, other governmental structures are entailed to focus on policy specification and implementation. Starting from 2010 the Ministry of Education and Science remain one of the most important players in Russian NIS. It holds in its hands around 20% of all civil R&D budget (OECD, 2011). Importantly, the Ministry is in charge of strategic and legislative activities for S&T as well as direction of policy implementation. It coordinates and distributes substantial amount of R&D budget by means of supporting research projects and providing grants to individuals and scientific groups. The Ministry also oversees international aspects of S&T and joint funding programs (ERA Watch, 2011).

Aside from the Ministry of Education and Science, there are several federal organizations that are necessary to be mentioned in respect of policy implementation:

1. *Foundation for Assistance to Small Innovative Enterprises* coordinates issues of funding that may result in creation of innovative start-ups.
2. *Russian Foundation for Basic Research* – the federal agency that is linked to RAS and supports basic research using competitive funding mechanisms.
3. *Russian Foundation for Humanities* pursues the same mission as the previous item, but with reference to Social Science and Humanities.
4. *Russian Foundation for Technological Development* funds research organizations that seek loans for technology development;
5. *The Ministry of Economic Development* actively supports SMEs through the mechanism of tax incentives for R&D, venture capital, technoparks and industrial zones, and by fostering innovation in large state companies.
7. *The Ministry of Industry and Trade* coordinates industrial sectors (e.g. aviation, electronics, and machinery) and possesses sufficient resources to stimulate their performance.
8. *Ministry of Finance* controls the budget for innovations and S&T and provides restrictions when the public money is overspent or misused.
Moreover, particular importance of RAS in Russian NIS should be underlined. Traditionally RAS possesses high privilege, prestige and autonomy as well as controls approximately 15% of the civil R&D budget (ERA Watch, 2011).

Concerning technologies development and commercialization, Russian government has created a special type of organizations that are owned by the state, but function on the border of public and private sectors. It has been done in order to ensure their flexibility and power. Among them the following are of particular interest:

1. **Russian Corporation of Nanotechnologies (RUSNANO)** – a state corporation for nanotechnologies that functions as a main investor and also ensures commercialization research results. Its infrastructure projects improve continuity of the innovation cycle (the Strategy, 2010).

2. **Russian Technologies (Rostec)** controls the equity shares of the Russian state that are distributed in over 500 companies and supervises issues of privatization.

3. **Rosatom (former Ministry of Atomic Energy)** coordinates Russian nuclear chain and oversees 200 enterprises and is crucial for the whole Russian NIS.

Other federal agencies promote innovation development of particular sectors. Thus, for every element of Russia’s NIS there is a coordination mechanism of policy implementation. Additionally, in the framework of the research **Russian Venture Company** (RVC) should be mentioned. It is a state fund of funds that directs public attention to venture capital industry and provides financial support to high-technology and innovation segment. Its capital is entirely owned by the Federal Agency for State Property Management. RVC was established in 2006 with a goal of developing venture capital sector in Russia. Nowadays, the company plays a crucial role in development of competitive and effective innovation system in Russia (OECD, 2011).

6.3.3 Innovation policy instruments with reference to UIG interaction

Important place in the innovation policy mix is devoted to the support of cooperative linkages between NIS actors. Coordination of such interactions and general direction of the innovation policy implementation is conducted by the Governmental Commission on High Technology and Innovation. With respect to UIG relations, the crucial role in policy implementation also plays the Ministry of Economic Development and the Ministry of Science and Education. It is also planned to introduce Advisory Councils as an instrument of coordination between the state and civil society that will unite representatives of national entrepreneurial alliances, non-governmental organizations,
business and professional associations, scientific and educational community, expert groups and charity funds.

In Russia’s NIS four main policy instruments identified by Hood (1983) and further developed by Gornitzka’s (1999) – funding, information, legislative authority and organization – are blended together and, subsequently, perform as inseparable “organism” in the overwhelming majority of cases. However, we will try to briefly shed light on each mechanism.

**Funding** remains the basic instrument of innovation policy implementation and control over UIG interactions. It is attached to the most governmental actions. Public financing applies grant mechanisms of the following forms (OECD 2009; 2011): cost estimate (Federal Budget defines the amount of support for fundamental and applied R&D in priority and other areas), foundation based (through public and private funds that support science and innovations) and through targeted programs. In addition, funding can be provided from venture or direct investment foundations.

At the same time, the importance of other instruments is growing. In the modern era of rapid electronic communication, **information** is regarded as an extremely valuable mean of policy implementation. It is intended to expand application of the Internet, open-access databases and informational channels to support UIG interaction in Russia. It will include new communication tools and assist in organization of collaborative work between NIS actors by providing comprehensive data on their actions.

**Authority** instrument in the form of legal framework is being constantly revised. This issue has been already discussed in Chapter 5 (section 5.2.2). As it was confirmed in conducted interviews, the state is eager to cooperate with respect to legislation improvement and brings in law modifications. For instance, the Federal Decree 217-FZ (2009), which allowed creation of SMEs jointly by HEIs and companies, has been amended in 2011 according to emerged criticism (Dezhina, 2011). However, all respondents have stated that those changes are introduced with insufficient pace and are underdeveloped in the majority of cases.

Ultimately, Russian government launches a considerable number of national **programs** and **development projects** that are focused on stimulating innovations through creation of favorable conditions for UIG interaction. Below this instrument will be examined in more detail as, combined

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with substantial funding, it is a priority instrument of national innovation policy. As it was stated in previous chapters, global UIG interactions are moving towards the TH regime, when trilateral networks are being created. Given this changing setting, Russian state regularly develops new policy instruments. Among them there is a considerable share of infrastructural projects aimed directly at promotion of UIG cooperation within Russian NIS. Several recent programs are of particular importance for the current research.

*Special Economic Zones (SEZs)* have been created for Technology Development as a part of strategy for improving Public-Private Collaboration. Companies were attracted to those areas due to favorable taxation conditions. In 2005 four Russian SEZs were established near St. Petersburg, Tomsk, Zelenograd and Dubna (ERA Watch, 2011). As they were created around important research centers, it enabled companies to operate closer to the scientific laboratories. Unfortunately, the ambiguity and complexity of tax benefits system created obstacles for planned SEZ development. The project is also suffering from the current Federal Budget cuts (Dezhina, 2011).

*Science Cities* (Naukograd) are special urban objects with high concentration of R&D infrastructure. In Soviet times they were officially closed and regarded as top-secret objects. As of 2010, there were 14 Science Cities in Russia identified by their scientific potential in different priority fields. National innovation policy sets special criteria that are needed to be fulfilled in order to be granted the status of Science City: (1) possession of industrial and scientific unit, (2) no more than 15% of the city's human resources must be employed in this unit; (3) S&T production should make up to no less than 50% of the whole city's share; (4) the city consists of scientific organizations, HEIs and other institutions that are engaged in R&D, S&T or innovative activity as well as other organizations with no less than 50% of knowledge-intensive production from their total output. All Science Cities enjoy special privileges.

*Technology Platforms* have been introduced in order to connect industry and research organizations. This term refers to the communication sites for cooperation of businesses, science, customers and government on the issues of S&T development (Ministry of Economic Development, 2010). This project was created in cooperation with the EU 7th Framework Program for Research and Development. As a result of the selection process in 2011, 27 Technology Platforms have been approved and received public funding. They have also obtained a priority status in the Russian Foundation for Technological Development, which provides interest free loans to support applied R&D projects (ERA Watch, 2011).

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Being established according to the European experience, Russian version of Technology Platforms has rapidly developed its local particularities (Dezhina, 2011). They turned out to be entirely state’s project with direct public funding and strict organizational regulations. Consequently, their challenging goals have not been achieved yet. Nevertheless, this initiative has had an important positive side effect – enhancement of interactions between companies and HEIs (ibid).

*The Skolkovo Innovation Center*, initiated in 2009, is one of the key innovation projects of the Russian state. It has been planned as an area for high-technology businesses and is frequently referred as Russian Silicon Valley (for instance, Forbes, 2010; The Moscow Times, 2010 and etc.). The center is primarily funded from the Federal Budget. Additionally, it enjoys rich investments and attracts Russian and foreign businesses (ERA Watch, 2011). The Skolkovo Innovation Center will encompass five research clusters (Energy, Nuclear, Biomedicine, Space and Information Technologies), a technopark, a university and a city. It is expected that the holistic results of the center’s activity will be available in 2015 (Dezhina, 2011).

To oversee the project, the Skolkovo Foundation was created in 2010. Its ambitious goal is to “transform Russia into an innovation-based economy and to reinforce economy's integration into the global network of talent” (Skolkovo Media Kit, 2012: 4). The Skolkovo Open University started functioning in April 2011 and now has over 250 students in Moscow, St. Petersburg and Tomsk. It does not grant degrees, but provides human resources for partner companies and future Skolkovo University of Science and Technology. However, despite the encouraging aims, Dezhina (ibid) has raised several major concerns about Skolkovo: (1) project is completely not connected with the existing infrastructure, (2) evident gaps can be observed in the planning process, (3) there are difficulties in further replication of the Skolkovo model, (4) total reliance on foreign experiences, (5) unclear system of potential projects assessment, and, most importantly, (6) the idea of a “closed city” is already out-of-date in the western world where the Open Innovations are currently considered effective. Ultimately, Dezhina (ibid) expresses an opinion that this initiative has reflected the mix of problems that exist in Russian NIS. Nevertheless, Skolkovo can be considered as a flagship of country’s innovation policy.

Another important, but relatively new instrument of innovation policy, is the *Foresight* – a special process oriented methodology targeted on the creation of future vision among the process participants that by their present actions support all parties of the system (the Forecast, 2010). It encompasses prospective thinking, strategic planning and networking. Its key concept bases on the mutual interest in the common future’s vision creation, cooperative attitude, long-term outlook and
the formation of coordination mechanisms. Foresight has already been applied in the majority of developed and many developing countries. In 2011 took place Russian foresight “Education in 2030: future roadmaps” devoted to dismantling of present educational structures and formational of principally innovative higher education system. This instrument is of a particular importance since Russia’s NIS lacks strategic and systemic approach that can be created through collaborative development of future’s image. If the process will involve all NIS actors, Foresight can become a new source of valuable ideas and innovations.

6.4 Policy linkage

Russian NIS is relatively young and is usually criticized for the lack of consistency and continuity (for example, Dezhina, 2011). However, below an overview of how innovation policy correlates with broader set of public policies will be provided.

The Strategy (2010) promotes the idea that governmental actions should consist of consolidated efforts and encompass all the instruments assessable: taxation policy, custom regulation, national public planning, procurement policy, migration policy and etc. Implementation of the innovation policy is connected with objectives from several aspects of socio-economic policy (ibid):

1. Budgetary policy – ensuring the priority financing of innovation (science, education, development institutes, business innovations);
2. Taxation policy – introduction of tax incentives to the NIS actors;
3. Technological policy – establishment of the technical regulation system, stimulation of technological modernization, diminishing barriers for new technologies implementation;
4. Competition policy and anticorruption efforts;
5. Public procurement – creation of necessary instruments to facilitate access of HEIs, scientific organizations and state authorities to innovation products;
6. External economic activity – supporting active participation of Russian innovation companies abroad, establishing partnerships with foreign technological partners;
7. Regional policy – setting a higher priority to support innovative regions.

Russian government is also developing national policy’s strategic documents hierarchy in order to avoid ambiguity. The Strategy (2010) is assessed as a systemic decree. In compliance with the Strategy, major governmental programs with reference to UIG interaction are created, such as “Development of Education”, “Development of S&T sector”, “Economic Development and Innovation Economy”, “Information Society”. Through these and other governmental programs, it
is intended to connect innovation policy with other sectors of economy and social welfare, including healthcare, culture and power production. With alliance to the mentioned documents, there will be relevant regional policies developed.

The aspect coordination between national and regional innovation policy is a separate issue of Russia’s NIS development. The positive experience of creation productive UIG cooperation in some Russian regions (for instance, Tomsk) should be replicated and integrated into a large innovation system. Coordination of linkages between regions and the Federal Government will be conducted by the Ministry of Economic Development with the participation of the Ministry of Regional Development, the Ministry of Science and Education, the Ministry of Transportation, the Ministry of Energy and the Ministry of Communications and Mass Media.

However, the Concept (2008) stated the insufficient connection of innovation policy with a wider context of national social-economic policy. One of the reasons for that fact is that up until 2008 innovation development in Russia suffered from unfavorable conditions. At that time priority objectives included vital issues of maintaining macroeconomic stability, improvement of social security and infrastructural modernization.

To conclude, despite the government efforts to link polices with reference to UIG interaction and innovation into a broader framework, there comprehensive picture and outcomes of those actions are still unclear. Indeed, those initiatives facilitate development of linkages between academia, different industries, businesses, various governmental agencies and regions, but they do not solve completely the problem of the lack of bottom-up initiatives towards innovations and closer UIG ties.

6.5 Policy evaluation

Since the creation, Russian innovation policy has not yet developed proper evaluation criteria. It entailed poor monitoring mechanisms and repeated process errors. Nevertheless, some evaluation instruments exist or are under construction. Firstly, innovation policy implementers are entailed to regularly report to the State Duma on the results of governmental initiatives (the Strategy, 2010). It helps to monitor the process of implementation and, as a result, can improve its performance. Secondly, relevant indicators of research efficiency (including within HEIs and companies) are being developed. Thirdly, it is planned to introduce state and social mechanisms of quality assurance and assessment of HEIs and scientific organizations and their outcomes with reference to
innovations. And finally, it is considered as obligatory to create an effective tool that will identify on a regular basis ineffective initiatives and abolish them.

In 2010 creation of monitoring system creation that will oversee achievement of outcomes was initiated. To assess policy results eight dimensions were considered: (1) formation of competences for innovation activities, (2) innovative business, (3) effective science, (4) innovative state, (5) infrastructure for innovation, (6) participation in global innovation system, (7) territories for innovations, and (8) funding. Specification of these criteria included several items connected with the degree of UIG interactions:

- intensity of expenditures of industrial enterprises on R&D;
- the share and expenditures of HEIs in R&D sector;
- the share of university funding obtained by means of S&T and R&D projects;
- the number of patents and licenses on know-how from companies, scientific and educational organizations;
- amount of SMEs created with the support in state’s development institutes and funds;
- the number of companies that use scientific equipment in the federal centers of open S&T equipment access;
- the number of Russia’s regions that have received funding for innovation territories creation;
- the number of innovation clusters that received public support after 2010 and doubled their high-technology export from this time;
- amount of public expenditures on R&D and education.

As it can be observed, above listed criteria do not compose comprehensive monitoring and evaluation system. They lack specific qualitative and, to the lesser extent, quantitative indicators of UIG interactions (Smorodinskaya, 2011). Currently it is difficult to assess productivity of UIG interaction and its future dynamics. Many of previous policy initiatives have been dropped without proper analysis. In the long run, it hampers the application of the TH model in Russia, as both positive and negative experience is not being applied in correcting the course of policies related to UIG interactions. It creates the situation when the state often has to constantly introduce new policies and projects with substantial funding without evaluation-based forecasts. Dezhina (2011) has also confirmed that one of the major Russia’s NIS problems is discrepancy in policy evaluation.
6.6 Policy challenges

As can be concluded from the chapters above, there are a number of problems that development of UIG interaction by means of Russian innovation policy is facing at the moment. Basing on the data from the field interviews and official reports, several points can be emphasized as policy challenges:

1. Ambiguity in legal definitions
Many problems of Russia’s NIS derive from the vague initial definitions of such vital terms as innovation, innovation activity, innovation process, innovation product. As a result, it rises misreading between different governmental bodies, including contradictions on national and regional level. Moreover, it hampers the consideration of UIG linkages in the legal framework as it is necessary to clearly define the milieu where those interactions occur.

2. Unrealistic and/or unclear objectives
National goals with reference to UIG relations are not sufficiently straightforward and comprehensive. They are disseminated around different documents and sections. It obstructs holistic understanding of each part of UIG interaction process (for example, particular situation in different economy sectors). Furthermore, strategies to reach productive UIG interface are frequently detached from reality as substantial amount of them is drawn only to account for resources. It is also connected with the phenomenon of “spontaneous strategic planning” when important policy decisions ought to be created within several days. Predictably, those polices often do not contain feasible objectives.

3. Excessive level of bureaucracy and state control
Strong governmental control and oversized bureaucracy mechanism unbalances UIG linkages in Russia and creates a very particular type of the TH model. Despite the occurred changes over the last decades, the state is still dominating. It creates obstacles and entails high level of resistance as all transformations are top-down. There is also an issue of interests’ lobbying and subsequent unfair competition. This problem derives from a concept of accessing the “administrative resource”.

4. Underdeveloped evaluation criteria and monitoring system
Criteria with reference to UIG interface are not clearly addressed, which complicated evaluation of state’s efforts towards development of productive interaction between NIS elements. It results in cyclic errors in policy making and implementation process. Additionally, statistical data on the policy performance becomes available with considerable delays. Since academia, industry and
government are principally different in their structure and value systems, a proper networking and feedback mechanisms are obligatory.

5. Lack of qualified labor force
This item refers to the necessity to train highly qualified human resources to be able to guide country’s innovation development. The country suffers from brain drain of S&T personnel as well as insufficient education level of civil servants.

From the state’s point of view, the main challenge in development of UIG interaction resides in the low interest of industry, HEIs and science in innovation. Thus, the government has to take a dominative role to stimulate their cooperation in Russia. At the same time, the Strategy (2010) points out that the state has been not able to overcome several major negative tendencies: cooperation between science and industry, science and universities and in between governmental agencies are still far from the desired stage. All in all, it delays Russian NIS integration into the global innovation system.
7 CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

This chapter will summarize main findings of the thesis following the research questions framework that has been developed in Chapter 1. To conclude, suggestions for further studies on the issue are elaborated.

7.1 Overview and suitability of conceptual framework

As the current thesis was developed, the issue of UIG interactions in Russian innovation policies has been studied. The aim was not to access the actual policy results, but to understand how UIG linkages are addressed by the state in general and by governmental innovation policies in particular. Theoretically the research has been framed by the application of the TH model in the Russian context, which underlines the dynamics of relationships between academia, industry and the state. The conceptual outline of the thesis has proved the importance of UIG interactions for country’s economic growth and justified its inclusion into innovation policies. Moreover, it has also identified possible limitations of these linkages development in Russia.

From the theoretical perspective, it was revealed that in Russia, like in other world, the TH model is considered extremely relevant. It is believed to foster innovative development of economy, improve knowledge and technology transfer, enhance spin-offs creation and stimulate strategic alliances between research laboratories, educators and public authorities. Dezhina and Kiseleva (2008) confirmed that development of UIG linkages is now no longer considered as a vertical process, rather as a horizontal interaction. Double-helix relations between government and science, government and education and government and industry are steadily becoming obsolete (ibid).

However, despite the increased attention and a widespread opinion that Russia is rapidly moving towards the TH model, our findings reveal not optimistic facts. First of all, the government still holds considerable power and resources and directs its efforts mainly to pre-defined priority areas. It creates an unbalanced system of top-down driven innovations that hampers initiative of other NIS actors and downgrades their performance. When changes are forced entirely by the official authorities, the quality of outcomes becomes highly uncertain. Secondly, interest towards innovations from Russian industry and HEIs remain alarmingly low. There were a substantial number of governmental programs launched in order to improve the situation, but they have
accomplished very modest results. Thirdly, there is still an extremely weak connection between science and HEIs. And finally, Russia’s sectors – industrial, scientific, university and governmental – are, for the most part, rigid systems that resist change. One of the reasons for that is the Soviet legacy of command economy with no room for bottom-up initiatives.

Subsequently, Russia’s place in the TH model can be considered between the first stage, where there is a clear predominant state, and the second stage, where the interactions between other NIS actors appear, starting from twofold connections with a strategic aim of becoming multilateral (Smorodinskaya, 2011). In such countries like Russia with the traditionally strong state and centralized power, innovation policy becomes a key mechanism of encouraging such linkages.

From theoretical perspective and given the limited scope of this study, the TH theory has been rather functional in the present thesis, especially as it highlights the role of government in fostering interactions between universities and industry. Nevertheless, for deeper and longer investigation of complex processes in innovation systems, it may be worthwhile to partner it with additional approaches that add the consideration of SMEs, individual entrepreneurs and other innovative activities and their contribution to innovation.

7.2 Main findings

In this section major findings of the thesis will be presented by returning to the research problem defined in Chapter 1. The main research question that this study attempted to answer was stated as follows: “How UIG interaction in Russia is addressed by Russian national innovation policies?”

To operationalize the above research problem, several sub-questions were formulated:

- How UIG interaction is reflected in Russian national innovation policies?
- How the Triple Helix model is applied in policies on UIG interaction?
- What are the main policy barriers for UIG interaction in Russia?
- What are the tendencies of UIG relations development with reference to Russian innovation policies?

Below main observations and concluding remarks on each of these questions will be outlined.
Development of UIG interaction is considered as an important component of Russian innovation system. Over the last decade its crucial role has been repeatedly stated in policy documents, secondary and field interviews. Consideration of issues related to promotion of partnerships between academia, state and industrial enterprises is included into strategic aims of Russian innovation policy. The more NIS is being created, the more attention is paid not only towards stimulation of its particular elements, but also ensuring their collaboration in innovation-driven environment. However, implementation of such initiatives in Russia has irregular nature. Hence, the results are frequently much poorer than expected outcomes. One of the reasons for that is that consideration of UIG interactions lacks integrity as most of the relevant issues are spread throughout different policy documents and state agencies and are weakly connected. Some statements are very broad and/or unfeasible.

In most cases UIG interaction aspects are not correlated with other policies that entail difficulty in their implementation. Field interviews confirm that, despite promising ideas, policies suffer from abridged approaches and are hampered by legal, bureaucratic and institutional barriers. Another issue is that they mostly incorporate issues on priority areas and directions, which leaves behind a considerable share of other socially important activities.

With reference to the second research question on how the TH modeless applied in innovation policies, the prevalence of “one-with-one” interactions in Russian NIS is revealed. In other words, government acts as a boarder and communication institute between academia and industry (Smorodinskaya, 2011). All field interviews express some concerns on the movements towards the TH system in Russia. National innovation policy tackles the TH regime of UIG interaction in several ways:

1. Launching national projects and innovative programs with an aim to unite NIS actors

There is a substantial number of governmental initiatives introduced in order to improve partnerships between industries, universities, scientific units and government and develop necessary infrastructure that reached various results (from successful to disastrous). However, the same pattern of the state’s behavior can be repeatedly observed. Again and again it creates rather closed structures to support innovations (special zones, clusters and etc.) instead of focusing on proper TH collaboration, which is now moving towards open innovations (Torkkeli et al., 2008). As a result, “natural” interactions between NIS elements are to some extent obstructed.

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2. Enhancement of industry participation in science and education through a diverse benefit system

One of the challenges for innovation policy is to improve participation of industrial and entrepreneurial sectors in innovation process and increase its interest towards R&D. Since many Russian large corporations in the country are state-owned, government successfully controls the level of their innovative activity. There is an obvious national interest and necessary instruments attached. However, innovation policies lack detailed attention towards medium companies, which results in unclear mechanisms of their integration into NIS. As a result, private businesses and SMEs remain reluctant to deal with local R&D process and prefer to import foreign technologies.

3. Improvements of private funding towards science and education

Innovation policy stresses the necessity to diversify funding sources for scientific and education sectors and to share risks with industry. It emphasizes that conditions should be created to boost co-financing schemes between companies and HEIs. Yet in reality there are few enterprises that participate in such projects. However, leading universities are being more and more engaged in cooperation with related industries on the issues of student placement and internships, joint research projects, curricula development and etc.

4. Integration of HEIs and science

As it may be seen from previous chapters, there is a historical division between universities and science in Russia. Current innovation policy underlines that the state is aware of the problem, understands its consequences and develops measures to overcome this shortcoming. In fact, according to the TH theory, universities are considered the main force that drives innovations (Etzkowitz, 2008). It is contrasted with the previous business-centered approach (Edquist, 2005). Nonetheless, Russian innovation system is still largely science-oriented with an intensive lobbying from RAS. So far the state has proved to be unable to implement working long-term solution to this problem.

The third research question was devoted to barriers for productive UIG interaction noted while analyzing Russian innovation policies. Basing on document analysis and face-to-face interviews, several main obstacles that hamper UIG interactions in Russia were identified:
Sources of funding are not sufficiently diversified. Uvarov (interview, 2010) emphasized the necessity to vary investment schemes in R&D, basing on western experiences, where universities and scientific organizations successfully raise funds and attract private funding.

There are scarce indirect instruments to stimulate UIG cooperation.

State support mechanisms are not sufficiently developed. On the one hand, project funding may be cut right after its launch. On the other hand, state provides excessive resources to the privileged areas or companies. It raises numerous questions on unfair competition.

Government should not aim at doing everything itself, rather to allow other NIS participants playing more active role in innovation through the advanced system of benefits.

National innovation policy lacks systemic approach and consistency. Some aspects are developed without correlation with broader socio-economic context and policies.

Monitoring and evaluation system is underdeveloped. It results in delays further application of successful models as well as correction of bad practices in UIG cooperation.

There is an absence of policies aimed at improving knowledge and technology transfer.

As for the last research question on tendencies of UIG interactions reflected in Russian innovation policy, several major points will be briefly pointed out. First of all, there is an increased application of forecasts and foresights, which shows an inclination towards long-term strategic planning.

Second, it is intended to further develop innovation infrastructure that stimulates UIG interaction as well as supports TH hybrid organizations (business incubators in HEIs, technoparks and etc.). However, the state should not be so excessively concentrated only on large-scale infrastructural projects that operate in the “closed innovations” environment, rather consider examples of advanced countries that are applying open innovation structures. Amongst all, the latter ones may successfully promote productive UIG interactions in various dimensions and foster the application of the TH regime in the country. Third, advancement of indirect measures to stimulate UIG linkages is on the innovation policy agenda. Additional tools are being developed in order to complement traditional funding structures of the Russian state. And finally, more attention is being paid to regional governments’ initiatives and their integration into Russia’s NIS. Taking into account county’s geographical characteristics, innovative development and economic growth are impossible without effective interface between its parts. As it can be seen from polices evolution, this trend will continue to expand.
7.3 Ideas for further studies

There are several possible directions of future research on the issue. First and foremost, to complement presented state’s perspective, subsequent investigation of industry and university segment is essential. It will allow having a holistic picture of UIG interaction within Russian innovation system. Since it is still being transformed, results of such study can complement its monitoring and evaluation. Another direction includes analysis of newly emerged elements in UIG interaction process in a form of case studies to access data on the most recent field phenomena. For instance, assessment of ad-hoc education programs recently flourished in Russia can be of value. They are usually initiated by proactive individuals and function on the border of education, research and corporate sector with occasional support of governmental agencies.
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APPENDIX

In-depth interview outline

In order for an interview to meet its objectives, a brief plan has been prepared in advance. It is important to note that interviews were non-structured, so the information below can be characterized as a guideline for the interviewer.

Consider before and while interviewing:

- Person’s position and responsibility level (policy, institutional, individual level)
- Interviewee’s area(s) of expertise
- Interviewee’s relation to public policy creation or implementation
- Familiarity of the respondent with the Triple Helix model

Questions groups (preliminary plan, questions may vary in each discussion):

1. Innovation policy in Russia
   - What changes in Russian innovation policy do you see know?
   - How in your opinion these changes influence innovative projects in the country?
   - What has not changed over the last decade? What do you think needs to be altered?
   - What are advantages and disadvantages of Russian innovation policy?

3. UIG interaction in Russia
   - How do you access the state of UIG interface in Russia?
   - What changes have you noticed over the decade that occurred in UIG interface in the country?
   - How the role of UIG interaction elements changed in Russian NIS?

4. UIG interactions in innovation policies
   - How do you see UIG relations’ reflection in Russian innovation policies?
   - Have you noticed any changes occurred over the last decade?
   - How do you assess relevant legislation on UIG interaction in Russia?
   - What obstacles do you see created by the state that hamper U-I interaction?
   - What factors support those relations? What fruitful initiatives from your perspective have been introduced by Russian government?