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Department of Industrial Management

Master's Thesis

The impact of industrial context and institutional factors on innovation and internationalization of Russian companies

Evgeniia Iuzeeva

1st Supervisor: Dr. Daria Podmetina

2nd Supervisor: Pr. Juha Väätänen

ABSTRACT

Author: Evgeniia Iuzeeva

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1st Supervisor: Dr. Daria Podmetina

2nd Supervisor: Pr. Juha Väätänen

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Innovation and internationalization nowadays play significant role in formation of the competitive advantage for the companies and it is important to explore these processes deeply and use their potential. Such parameters, as industrial context and institutional factors, are essential parts of the business life and their influence may be crucial for the company's performance.

The Master's Thesis explores impact of industrial context and institutional factors on innovation and internationalization of Russian companies. This research is quantitative and based on the analysis of the relevant scientific literature and results of the survey, conducted among Russian manufacturing companies.

Findings show positive influence of industrial context factor "international threat" and institutional environment factor "lack of resources and the market imperfections" on internationalization of innovative Russian companies.

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"Although deep down, you know you don't miss a place, but strange and magical conjunction of the right place, the right moment and the right people. That year when you traveled, when you shared your life with special ones, when you were so happy"

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Evgeniia Iuzeeva

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LIST OF ABBREVIATIONS

ANOVA – Analysis of Variance

BRIC – Brazil, Russia, India, China

CIS – Commonwealth of Independent States

FDI – Foreign Direct Investment

GNI – Gross National Income

INV – International New Venture

JSC – Joint Stock Companies

NPD – New Product Development

OECD – The Organization for Economic Cooperation and Development

OLI – Ownership Location Internationalization

PPP – Purchasing Power Parity

R&D – Research and Development

SMEs – Small and Medium-sized Enterprises

1. Introduction

Nowadays innovation and internationalization processes are becoming essential for the business life. The phenomenon of internationalization has been widely discussed in scientific literature, however there is still a gap in explanation of interconnections of this process with innovation and factors, which influence both of them.

This research aims to identify the impact of industrial context and institutional environment on innovation and internationalization of the companies. The novelty of this research is reflected in the consideration of innovation and internationalization in the case of Russia.

1.1. Background

Firms, who are active in international markets generate more knowledge than their counterparts which operate in the national market only (Pittiglio et al. 2009). For further development, companies need to produce innovative products and enter foreign markets. There are many modes how to gain to the new market, but first of all it is important to understand industry context and how it influences innovation and internationalization processes.

Although, there is a great amount of research on both phenomena at the scientific literature, little is known about how specific industry context factors influence the internationalization process (Laurell et al. 2013). Laurell et al. 2013 in their study claimed that specific industry context may have a crucial role at the process of internationalization. For instance, she considered that international new ventures in the life sciences industry face distinct challenges. Also, companies of different industries may face different intensity of entry barriers to international markets. High product development costs push companies into early internationalization to increase sales turnover and recover investments (Laurell et al. 2013).

Russia is a manufacturing country with widely spread plants and factories, however there are a lot of challenges with innovation in this particular area. At the factories the process of innovation is complicated due to fact that the power of old habits is strong. Many countries get access to the cheap labor force and have an opportunity to locate their manufactories at the countries with lower tax rates. For example, during several years, American companies are basing their factories in China and Mexico, and Germany has the same situation in Poland. Currently it tends to reverse innovation – companies are producing new products at the developing countries and after that, they are adopting it to the developed countries (Govindarajan and Ramamurti, 2011). It lets them easy way to the cheap recourses and opens new high potential markets, such as China and India. Currently this situation opens great opportunities for Russian companies to internationalize their.

Internationalization requires great efforts and costs from the companies, and competition is tough. The amount of factories and engineering companies is significant in Russia. For successful further development, they need to introduce innovations, which sometimes very difficult. Particular rules and regulations exist at the factories and it is hard to break stuck system. "Rigidity of organizational structures and inertia of local production networks put serious limitation on radical product and technological innovations…in Russia" (Gurkov, 2005). Most of workers do not have enough motivation to offer fresh idea and improvements of the products. The percentage of people of older generation at the factories is bigger, than young generation. Because of it, most of workers are trying to save existing schemes and processes and it is impossible to use basic methods of innovation and internationalization in this particular area. In other words, there is intrinsic resistance towards innovation of products and process in the firms. Some specific features may play crucial role at the ability of company to innovate or enter new markets.

According to previous research, innovation and internationalization have a great impact on each other. Altomonte at al. 2013 stated that in the medium to long term internationalization is likely driven by innovation. Without constant development it will be difficult for Russian companies to enter new potential markets. Internationalization includes a number of difficulties, such as differences in culture and language, laws, level and quality of education.

1.2. Research objectives, problem and questions

This research examines the impact of industrial context and institutional factors on innovation and internationalization of the Russian companies. Thus, thesis aims:

1. To study how Russian firms form clusters with different level of innovation and internationalization activities.
2. To analyze the specific factors of industrial and institutional contexts, such as market turbulence and pressure of competitors, which may facilitate the positive or negative effect on innovation and internationalization.

According to these objectives, the following research question should be stated: ***"How does the industrial context and institutional factors influence innovation and internationalization of the Russian companies?"***

Development of the different industries in Russia may vary due to the specific conditions – availability of natural resources, traditions, ways of doing business, etc. Thus, the first sub-question, that should be considered, is:

1. Which traits of the industrial context influence innovation and internationalization of the Russian companies?

Institutional environment in Russia stays apart from the other countries because of the unique traditions and norms. Widespread bureaucracy, phenomenon of "blat" (Andvig, 2006; Ledeneva, 1996) and other significant distinctions may have unpredictable impact on business processes. Therefore, the second sub-question is:

2. Which institutional factors mostly influence innovation and internationalization of the Russian companies?

By answering these sub questions, we will provide conclusion on specific situation in Russian companies and which factors prevent these companies from successful innovation development or entering of foreign markets.

1.3. Structure of the thesis

Thesis contains six chapters and has the following structure: the first chapter is introduction, which provides reasoning for the research, all necessary background information and sets the research questions and objectives. The second chapter describes methods of the research and data collection. Third chapter gives overview of the literature from the field of study. At forth chapter data collection and analysis are presented. Fifth chapter is providing research results and findings. The final chapter discusses results and implications and gives conclusion. The structure of the Thesis represented at the Figure 1 below.

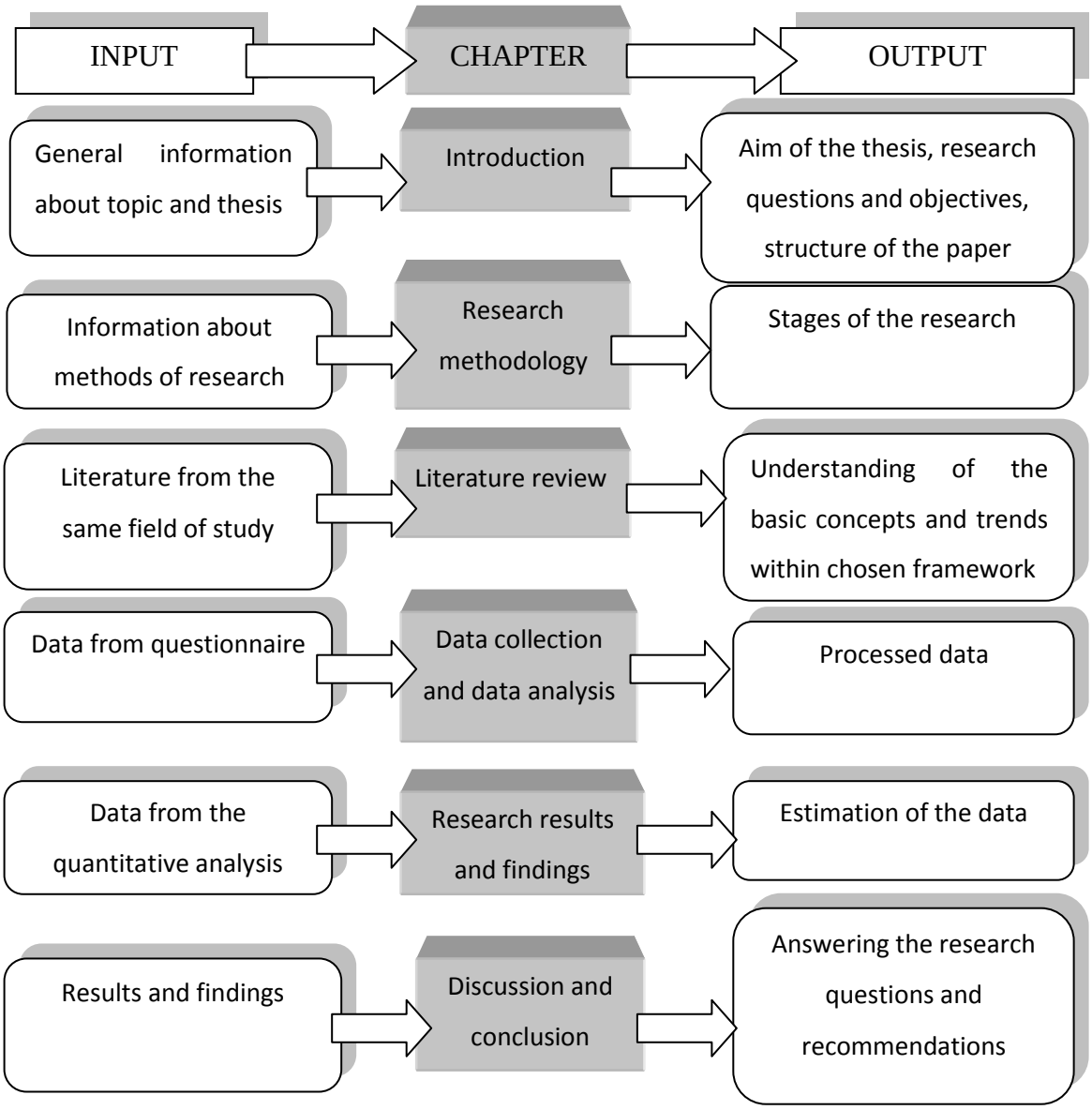

Figure 1. Structure of the thesis

2. Research design and methodology

This research is quantitative and analysis is conducted with the SPSS software. Literature analysis presented the overview of main trends at the internationalization and innovation for the last 7 years, including specification of the Russian market. Quantitative analysis of 206 companies allows examining of these trends particularly for the Russian pattern.

2.1. Research design, credibility of research findings and limitations

According to the classification by Saunders et al. (2009), this study is using Survey as the research design strategy. This type of strategy allows quantitative data collection through the questionnaire and collected data can be used to define relationships between variables and produce possible models of these relationships (Saunders et al. 2009), which is suitable for the aims of this particular study.

This study has several limitations. First, the number of considered industries is restricted according to the surveyed companies. It's possible to examine impact of internationalization and innovation on other industries. Second, the sample consists of Russian manufacturing, IT and telecommunication companies, but does not take into account other countries. Further researches may consider stated problem in different countries.

2.2. Data collection

This study is based on the survey of 206 Russian manufacturing companies, which was done in the end of 2009 – beginning of 2010 within international project, aiming at studying innovations in Russian companies. Data were collected through the structured interviews with top managers as key respondents. Companies were selected for the survey using three criteria (strata) – region, industry and annual revenue. Stratified sample approach was chosen as a sampling method. The questionnaire was developed based on European Innovation scoreboard Methodology and extensive analysis of academic papers

in the field. Questionnaire contains questions about diverse companies' business aspects, such as strategy, innovations, position on the international market, etc.

2.3. Sample description

The sample for the quantitative analysis contains 206 companies from different Russian regions. The list of cities includes nine names – Saint-Petersburg, Samara, Perm, Yekaterinburg, Krasnoyarsk, Nizhny Novgorod, Rostov-on-Don, Saratov and Novosibirsk. The selection of regions was done based on the rating of most innovative regions, completed using Rosstat data (Rosstat, 2009). Only the most innovative regions were taken into consideration, when planning sample for data collection. 184 companies have NPD and only 22 companies are not developing new technologies. Novelty of the products varies from "modification of existing products" to "new to the world" (Figure 2).

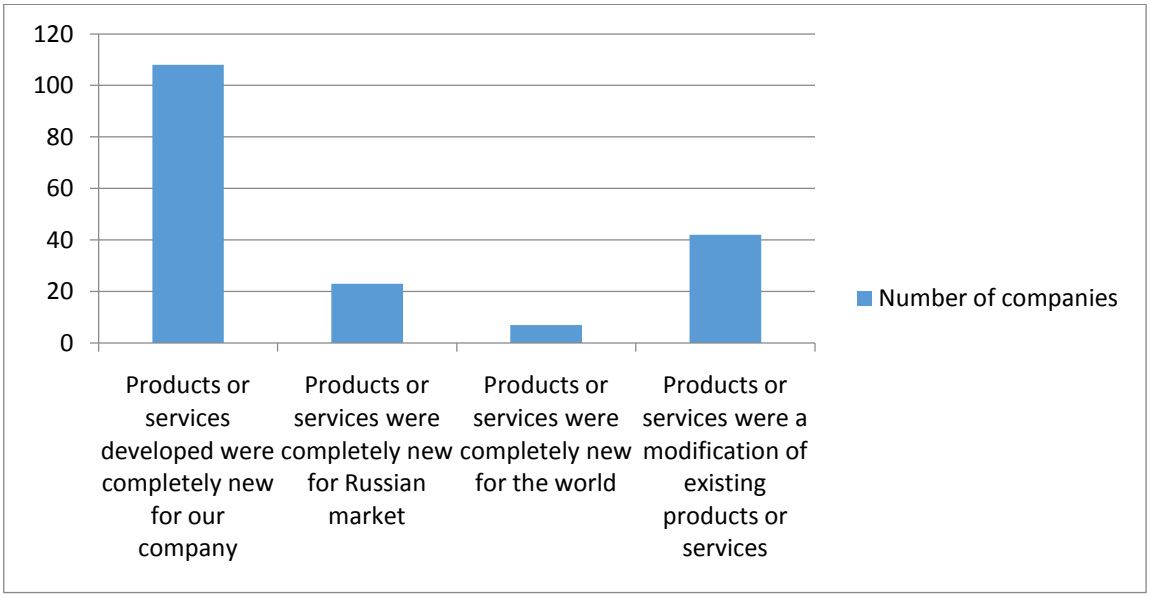

Figure 2. Novelty of the products

Figure 3 reflects Ratio of R&D costs and companies' sales volume. More than half of the companies have ratio 0-3%, at the same time, almost quarter of the companies have significant value of the ratio of R&D costs and sales volume – more than 10%.

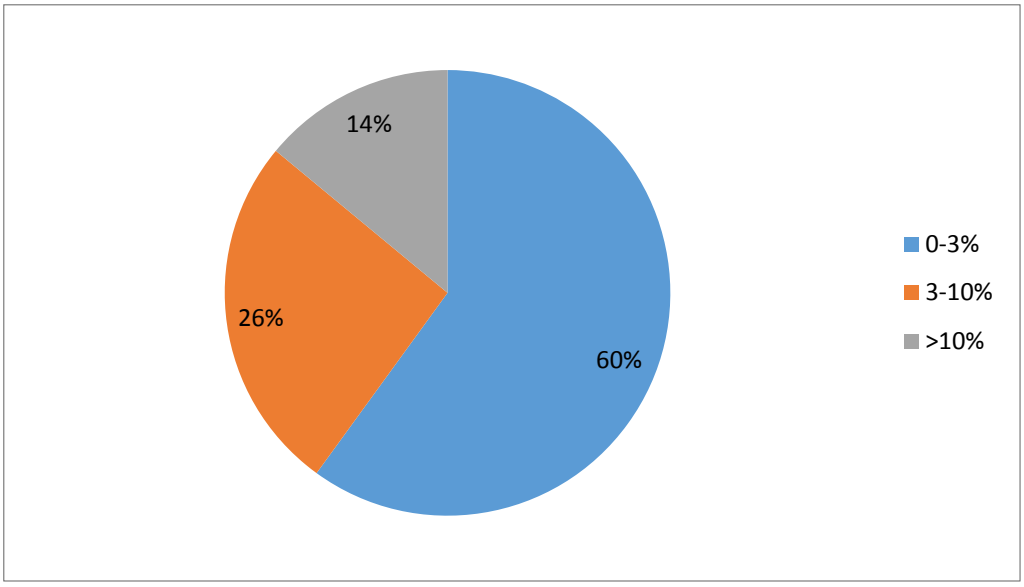

Figure 3. Ratio of R&D costs and sales volume

Collected data allow examining of innovation and internationalization processes at different industrial contexts, including machine building, metallurgy, IT and telecommunications, chemical industry, electronic equipment and several others. There are almost equal amount of high tech and low tech companies and less amount of medium tech companies (Figure 4).

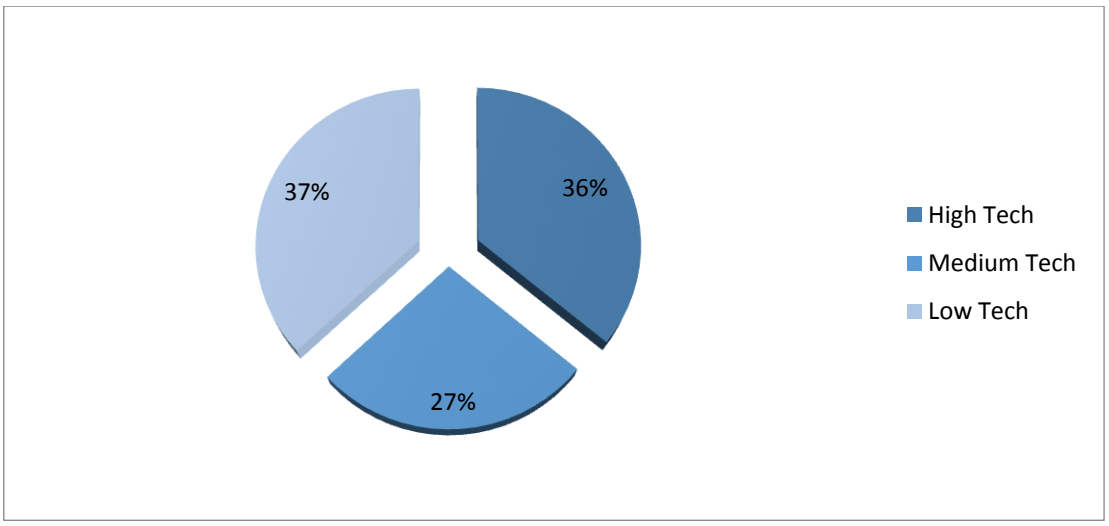

Figure 4. Share of High, Medium and Low Tech companies

Sample represents mostly medium (100–250), large (250–1000 employees) and very large enterprises (over 1000 employees) (25,5%, 33,9% and 23,9% respectively). Companies distinguish through the type of ownership – governmental (6%), new enterprises, which were established after the dissolution of the Soviet Union in 1991 (49,5%), enterprises with

foreign capital involved (share of foreign capital more than 10%) (5,3%), and privatized companies (39,2%).

Concerning the process of internationalization, companies have diverse experience. Most of the companies have rather no experience or long experience, than somewhere between (Figure 5).

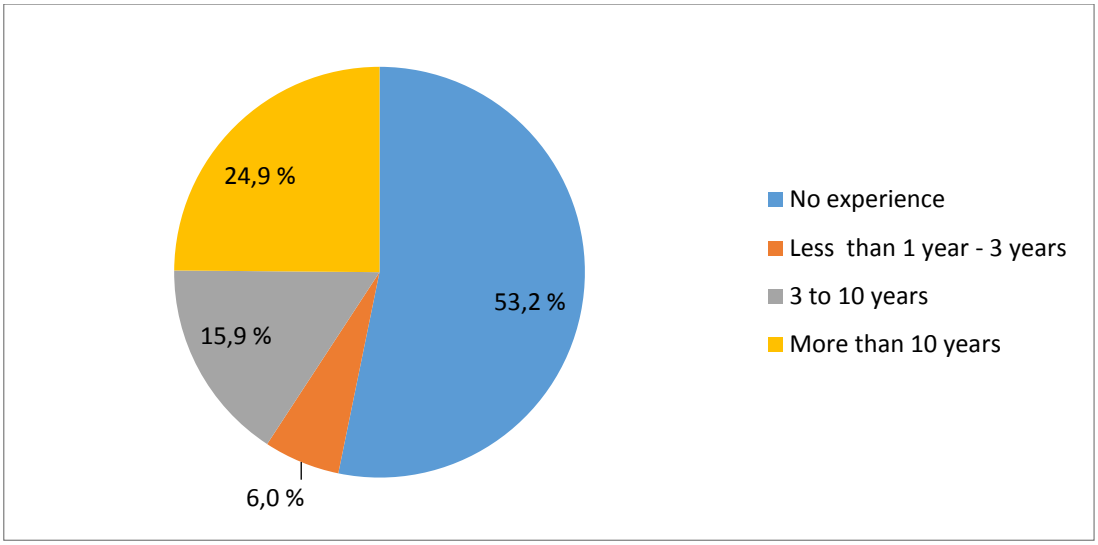

Figure 5. Share of companies considering internationalization experience

2.4. Methods of analysis

Empirical part includes cluster, factor, ANOVA and logistic regression analysis. Cluster analysis was implemented in order to identify which combinations of companies in case of innovation and internationalization activities are presented in the sample. Factor analysis is aiming to discover whether the covariances or correlations between a set of observed variables can be explained in terms of a smaller number of factors (Landau and Everitte, 2004). ANOVA analysis aims to find out if there is statictically significant difference between means of different variable for the groups of other variable. The main goal of logistic regression is to explore the relationships between company internationalization and industrial and institutional factors, which were defined in factor analysis.

3. Literature review

This part represents review of the academic literature related to the topic *internationalization and innovation* and factors, influencing these two phenomena. Search for the relevant studies was conducted through the several databases, including EBSCO, Scopus and SpringerLink eJournals. The search criteria is dealing with the following terms (but not limited to): "internationalization", "innovation", "emerging markets", "industr*", "institution*". The specific context of BRIC countries and Russia will be considered more in the chapter 4.

3.1. Internationalization

Many researchers attempted to give appropriate, mutually exclusive and collectively exhaustive explanation of the internationalization. They examined it from the perspectives of strategy, resources, networks and international operations (Welch and Luostarinen, 1993, Johanson and Mattson, 1993, Lehtinen and Penttinen, 1999). Basically, "internationalization is a synonym for the geographical expansion of economic activities over a national country's border" (Ruzzier, 2006). Firms decided to internationalize have diverse reasons and triggers for this important step. According to Hollensen (2007), there are two types of motives for internationalization – proactive and reactive. The group of companies with first motive is seeking for the opportunity to increase their profit and get other benefits from expansion abroad. The second group is reacting on the external factors, such as pressure of competitors or local market's saturation.

This study aims to deeper examine factors influence the decision to internationalize, however it is necessary to start from the basic concepts.

Theories of internationalization

The process of internationalization is widely described in scientific literature and the amount of theories considering this topic is significant. There is no opportunity to examine

all available pieces of information, however, it is necessary to include several central concepts in order to provide appropriate theoretical background for the particular study.

OLI paradigm, also known as eclectic, was created by Dunning in 1977 and considers selection of the target country and three conditions of the company's internationalization. The first one is an ownership advantage, which implies possession of competitive knowledge, technology or product. The second is location advantage, which explains the intention of the company to internationalize instead of proceeding action on domestic market. This advantage may be in case of better positioning of the factory, low labor cost in chosen country or avoiding high transaction costs from domestic market operations. Final condition is internationalization advantage, according to it the producing of products on foreign market should be more profitable, than export. Export is the easiest way to expand company's operations abroad, thus there should be significant reason to proceed from export to manufacturing in another country, which has more difficulties and risks. For the best results, it is smart to choose country with all these advantages (Dunning, 1977).

Uppsala model (U-model) assumes that companies usually begin the process of internationalization from the export through agents, than they introduce their own sales organization on the foreign market and, finally, they are starting to produce goods on this market (Johanson and Vahlne 1997). In addition, as a part of the model, Johanson and Vahlne (1997) consider the term "psychic distance", which defines the desire of companies to internationalize their activities into the close to domestic markets, in order to overcome problems with understanding of new environment. This model was reconsidered by its creators in 2009, authors took into account the changes in business practices and defined the business environment as a web of networks (Laurell et al. 2013). Filippov (2010) compared this model to the Russian context and examined that Russian companies also tend to start internationalization process from the close markets of CIS due to similarity in language, traditions and way of business presence.

Innovation-related models (I-Models) examine the process of internationalization as a sequence of discrete stages. There are also stable periods take place between the stages, when a firm consolidates and generates appropriate resource base to respond to environmental conditions, which allow it to proceed to the next stage (Volchek 2013).

Thus, these models emphasis the combination of learning process, accumulation of the necessary knowledge, and innovation (Andersen, 1993). Every step of internationalization is an innovation for the company (Gankema et al., 2000, cited in Ruzzier, 2006). Leonidou and Katsikeas (1996) defined three main steps - the pre-export stage, the initial export stage, and the advanced export stage, however there are variations in number of stages in different literature resources.

International new venture (INV) is a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sales of outputs in multiple countries (Oviatt and McDougall 1994). Such organization rather internationalize rapidly than incrementally in order to possess benefits of first movers (Chetty and Campbell, 2004). Anderson and Wictor 2003 pointed out, that INVs tend to rely heavily on networking to source supplementary competencies of other firm, for example, in R&D and distribution. While globalization trends facilitate rapid internationalization, industry factors can both facilitate and constrain it, and in this process, the role of entrepreneurs and their personal networks can play a crucial role (Anderson and Wictor, 2003).

Network theory has been widely described in scientific literature. This theory proposes that companies with limited resources for innovation and internationalization, nonetheless may implement successful strategy by using their network relationships. (Chetty and Stangl, 2009). Small firms usually have limited amount of resources in contrast with big enterprises. However, well-developed web of networks allows these firms to get necessary resources and knowledge from collaboration with other companies. For instance, the concept of open innovations explains possibility to get new ideas from the companies, who opened their unused researches and ideas for the wide audience (Chesbrough, 2006).

Chetty and Stangl (2009) defined four types of network in consideration with innovation and internationalization – radical innovation/internationalization with rapid development of social relationships, incremental innovation/radical internationalization with consistent stages of first innovation and then internationalization, radical innovation/incremental internationalization with need of network development and incremental

innovation/incremental internationalization implication to diversify social relationships on early stages of the firm growth.

Different views on internationalization

Internationalization may be examined from different sides. Hilmersson (2013) considered the process of the internationalization from the three diverse perspectives – scale, scope and speed. "Whereas the scale (share of sales abroad) and the scope (number of foreign markets served) of firm internationalization concerns the degree to which the firm involves itself in international operations, the speed of internationalization relates to the speed at which the firm's activities are spread internationally" (Himersson, 2013).

Tsukanova (2012) consider the process of internationalization in transitional economies from the three sides: resource-based (Barney, 1991); industry-based (Porter, 1980); and institution-based views (Kogut, 2003; North, 1990) (Figure 6).

Figure 6. Three pillars of internationalization (Tsukanova, 2012)

From the resource-based view the firm's resources are considering as a competitive advantage, which leads to the higher performance of the firm during internationalization process. Industry-based view takes into account level of the competition of the firm's

industry, which also may influence performance of the firm on international market. The concepts of resource- and industry-based view are widely examined at the scientific literature. However, usually limited attention payed to the third pillar of the internationalization propensity – institutional-based view. According to the institutional-based view, institutional factors are vary on the different international markets and may influence process of internationalization both positively and negatively. However, Tsukanova (2012) defined that institutional hostility of the Russian market has negative effect on the firm's performance. "Institutional hostility that occurs in unfavorable regulations (tax regime, legal system), instability, corruption, and bureaucracy is a severe obstacle for internationalization" (Tsukanova, 2012).

3.2. Internationalization and innovation

Nowadays, the relationships between internationalization and innovation have a great interest in the scientific literature. Altomonte et al. (2013) in his study "Internationalization and innovation" examined that correlation between these two parameters are quite strong. Firms with high innovation intensity tend also to show high internationalization intensity (Altomonte et al. 2013). In addition, Onetti et al. (2010) stated, that innovation and internationalization are more likely to be instantaneous, fast, and inter-related. Both inward and outward internationalization influence innovation either absorbing knowledge of production processes or creating opportunities for product innovation development (Halilem et al. 2013). "In case the firm already operates on foreign markets, its innovativeness in introducing new technological processes and positioning of its products and/or services provides significant increase in firm's international performance" (Podmetina and Volchek, 2013).

Most of researchers studied interconnection between internationalization and innovation by analyzing companies with diverse characteristics. For instance, Altomonte et al. (2013) examined the relationship between these two phenomena, using the EFIGE dataset with information on different industries and regions across seven European countries. Firms with high innovation intensity tend also to show high internationalization intensity (Altomonte et al. 2013). In the study he defined, that innovation and internationalization

have a strong positive correlation between each other. Firms with strong R&D and innovation performance have competitive advantage on both domestic and international markets. From the other side, internationalization process opens doors to the diverse world of up-to-date information, modern technologies and new resources. These instruments allow firms to acquire new ideas and perform high innovation activity.

Innovation subdivides into several types – not only product and process, but also organizational and marketing innovations (Oslo manual, 2007). Chetty and Stangl (2009) describes these types according to the Organisation for Economic Co-operation and Development (OECD), where product innovation is an enhanced goods or services with intention to improve sales indicators or customer satisfaction; process innovation is a way to produce goods with lowest costs and better quality; marketing innovation is improvement of packaging, design or product promotion in order to increase sales level; organizational innovation is change at the performance of business actions, which aimed to decrease costs and enhance employee benefits. The interrelationships between innovation and internationalization may vary depends on the type of innovation. Van Beveren and Vandenbussche (2010) claim that the mixture of product and process innovations boost company's proclivity to export. Moreover, Damijan et al. (2010) consider process innovation as a leading element in this combination. In addition, according to Podmetina and Volchek (2013), technological and marketing innovations have considerable positive effect on internationalization scale of the company.

Welch and Welch (1996) defined that reciprocal relationships between innovation and internationalization are industry sensitive. However, there is significantly more factors influence these dual relationships.

3.3. Factors influence innovation and internationalization

According to the Pittiglio *et al.* 2009, three main factors affect innovation output: innovative inputs and firm's characteristics, external factors, which allow flows of ideas within a country and external factors, which allows flows of idea from abroad.

There are three main firm's characteristic, which may influence process of innovation and internationalization. These are organization's size, age and country of origin. Mittelstaedt (2003) stated that bigger enterprises have more internal resources and capabilities, thus better opportunities for successful international competition. However, Xiaobao (2013) highlighted that small companies may solve this problem with lack of resources through their well developed networking capabilities. In contrast with widespread opinion about low innovation performance of the small firms, they are not losing this game with big enterprises. Despite lack of the resources and investments in R&D, small firms outperform big companies in innovation outputs (Pianta and Vaona, 2007).

The age of the firm was considered by Johanson and Vahlne (2009) to influence the process of internationalization gradually, over time, through better understanding of foreign markets. The greater experience of the firm, the deeper its knowledge about possible difficulties and pitfalls on international market and, consequently, more confidence and proclivity to internationalize. Raymond et al. (2014) reflect on country of origin as a significant factor, which includes such indicators as geographical location, available resources and government incentives. Institutional factors may vary between countries considerably.

External factors also play crucial role at the innovation processes of the company. Particular firm may not have enough resources or knowledge to provide necessary improvements. Attraction of the external expertise will help to avoid the pitfalls. The firm can enhance its innovation activity by making contracts and establishing alliances with other firms (Santos et al. 2004). This will involve some additional costs, but leads to the significant benefits.

External factors, which allow flows of idea from abroad, may have a great impact on innovation activity. Internationalization provides the opportunity to capture ideas from a greater number of new and different markets, as well as from a wide range of cultural perspectives; therefore, globally engaged firms have more opportunities to learn (Hitt et al. 1997).

There are several more factors, influence innovation and internationalization performance of the firms:

- Market turbulence and uncertainty.

The majority of Russian business leaders prefer to make as much short-term profit, as possible at the expense of long-term investment in their productive facilities and innovation due to uncertainties about the future (Filippov, S. 2011). Marketing turbulence had significant positive relationship with the internationalization, implying that the higher uncertainty on the domestic market often pushes companies to look for new foreign markets, where both market turbulence and institutional uncertainty are reduced (Podmetina and Volchek, 2013).

- Institutional factors.

Yamakawa et al. (2008) assumes that it is worthwhile to explore impact of institutional, industrial and firm-specific factors on internationalization of Russian companies as a part of transition economies. Institutional factors have significant influence on both innovation and internationalization processes of the emerging market firms. Khanna et al. (2005) stated that emerging markets are suffer from the weak institutional factors much more than developed ones. Author claimed that it is necessary to focus on social and relational capital rather than labor and product, as it was before. “Lack of infrastructure and financing, and the low level of consumer sophistication can lead to a failure of innovation development – the environment itself causes potential inhibiting factors for firms aiming to develop new products” (Smirnova et al. 2012)

- Competition.

Kadochnikov et al. (2003) examined product innovations as crucial for the firm’s successful performance and considered competition as a main factor influents these

innovations. Driving power of competition is influencing the export activity of the firm (Podmetina and Volchek, 2013). Limited competition in the domestic market reduces the push for efficiency through investment in innovation (Filippov, S. 2011) According to Tsukanova (2012), competitive hostility has positive impact on the internationalization proclivity of the Russian companies.

- Industrial context.

Porter (1980) described industry as basic, essential characteristics of competitive strategy for companies with similar products. Wang et al. (2011) stated, that different industries have different potential for the internationalization.

- Other factors.

According to Castellani and Zanfei (2007), firm's heterogeneity, internationalization modes and innovation performance are influence relationships between innovation and internationalization. Also, Chetty and Stangl (2009) consider influence of political and technological transformations on companies' proclivity to innovate in order to enhance economic growth and productivity. In addition, Tovstiga et al. (2004) proposed to consider influence of macro-economic obstacles, lacking managerial and business competencies and differences in culture and business practices as specific factors which influence internationalization of innovative Russian companies. Summary of the factors presented in the Table 1.

Table 1. Factors, influence innovation and internationalization

Factors	Understanding	Authors
Size of the organization	Companies of different sizes use distinct ways for the internationalization and innovation	Mittelstaedt 2003, Xiaobao 2013, Pianta and Vaona 2007
Age of the firm	Mature companies have more proclivity to internationalize due to valuable experience	Johanson and Vahlne 2009
Country of origin	Geographical location, available resources and government incentives of the country may influence internationalization and innovation processes of domestic firms	Raymond et al. 2014
External factors	External expertise may help to avoid pitfalls and facilitate successful internationalization	Santos et al. 2004, Hitt et al. 1997

	and innovation	
Market turbulence and uncertainty	Push companies to investigate new opportunities through innovation and internationalization	Filippov, S. 2011, Podmetina and Volchek, 2013
Institutional factors	Weak institutional system may negatively influence innovation and internationalization development of the firm	Yamakawa et al. 2008, Khanna et al. 2005, Smirnova et al. 2012
Competition	Positively facilitate innovation and internationalization processes of the firm	Kadochnikov et al. 2003, Podmetina, D. and Volchek, D., Filippov, S. 2011, Tsukanova 2012
Industrial context	Differ in case of internationalization potential	Porter 1980, Wang et al. 2011
Other factors	These factors include heterogeneity, internationalization modes, innovation performance, political and technological transformations, macro-economic obstacles, lacking managerial and business competencies, and differences in culture and business practices	Castellani and Zanfei 2007, Chetty and Stangl 2009, Tovstiga et al. 2004

3.4. Industrial context

According to Wang et al. (2011), different industries have different potential for the internationalization, for instance industries with standardized products are more internationalized, than non-standardized one with need to satisfy specific customer's demand. Due to the specific of Russian area, most of companies are operating at the resource-intensive sectors. These companies have an access to the diverse government's support, including financial payments (Filippov, S., 2011). They significantly rely on state's funding instead of company's own assets, which prevent firms from internationalization in order to acquire new knowledge and resource capabilities (Volchek, 2013). Another industries could not get benefits from former stated-owned institutions, that is why they have to seek for another ways of getting access to the new technologies, such as alliances and partnerships with foreign companies (Filippov, S., 2008).

However, "The prices for oil and other natural resources have dropped dramatically, which has put the whole economy on the risk due to decreased export income. If the Russian Federation wants to achieve sustainable growth in future years, it has to move away from a resource-based economy. The Russian economy has to diversify, embrace innovation and shift to a knowledge-based economy (EIU, 2007)."(Podmetina et al. 2011) During the last year situation with oil deteriorates further. Thus, it may push companies to internationalization in order to acquire new competitive technologies.

Instead of usual global industrial sectors, such as automotive industry and electronics, Russian companies have more developed heavy machinery manufacturing (Filippov, S., 2011). Due to the scientific traditions of the Soviet Union, IT and software sectors, one of the most knowledge and technology intensive ones, are growing rapidly and innovation is a driver for their internationalization (Filippov, S., 2011).

Boter & Holmquist (1996) found that "the term industry is frequently used to classify individual companies on the basis of a set of common characteristics mainly related to types of

products, production technology, or market attributes". Particularly industry structure is described by Porter (1980) as the basic, essential characteristics that define the competitive strategy for the companies with similar products.

In their study of interaction between industrial characteristics and internationalization process, Boter & Holmquist (1996) defined two types of companies – conventional and innovative. The first group includes traditional manufacturing companies from the industries, established long time ago. This type of companies usually implement well known and experience proved technologies. The second group of companies is comparatively young and they are daring to use new innovative technologies. As a result of the study, author defined high dependence of conventional companies' internationalization from the structure of an industry in contrast with innovative companies, which are independent from this factor. In addition to this, Evangelista (1996) stated that percentage of innovative firms is much higher in high-tech industries, than in traditional ones. In addition, the amount of large firms with strong innovation proclivity exceed amount of small firms. It may explains by lower internal resources, possessed by small firms.

Fernhaber, McDougall & Oviatt (2007) in their work "Exploring the role of industry structure in new venture internationalization" analyzed and discovered about 20 different industry variables, which presented in the Table 2.

Table 2. Industry variables (McDougall & Oviatt, 2007)

Variables	Measurement	Reference
Industry advertising intensity	"Advertising expenditures as a percentage of sales"	Kobrin, 1991
Industry asset intensity	"Represents a plausible indicator for capital requirements, a proxy for entry barriers, and a determinant of economies of scale".	Luo & Tan, 1997
Industry buyer concentration	"A measure of the number of potential customers in the target market during the first two years of sales"	Keeley & Roure, 1990
Industry competition	"Reflects industries where	Chung, 2001

	one entry motive is more likely than another"	
Industry concentration	"Indicates the number and relative power of concentration firms in an industry"	Fernhaber, McDougall & Oviatt, 2007
Industry density	Refers to understanding industry evolution. "Population vital rates (foundings and mortality) depend on the interplay of legitimation and competition forces, which are a function of the population's density".	Mascarenhas, 1995
Industry economies of scale	"Economies of scale serve as a barrier to entry"	Dean & Meyer, 1996
Industry evolution	"Refers to whether an industry is just emerging, evolution experiencing rapid growth or in a state of maturity"	Fernhaber, McDougall & Oviatt, 2007
Industry growth	"Industry's rate of demand growth"	Dean & Meyer, 1996
Industry product differentiation	"Established brand names, company reputations, control of superior product design, and control of favored distribution channels"	Dean & Meyer, 1996
Industry profitability	Inter-industry variance in profitability	Dean & Meyer, 1996
Industry uncertainty	"Capture structural uncertainty and patterns in the growth of the number of firms, in addition to some attributes commonly recognized in all economies such as profitability, growth, and asset intensity"	Luo & Tan, 1997
Knowledge intensity of industry	"The extent to which organizational knowledge intensity and learning is relied upon by industry of industry firms"	Fernhaber, McDougall & Oviatt, 2007
Sales dynamics of industry niches	"Devised to measure the changes in the sales of	Dean & Meyer, 1996

	product classes (five-digit S.I.C.s) within an industry"	
Technological development in industry	"Measured as the industry's R&D intensity…calculated as the ratio of company-financed industry R&D expenditures to sales"	Dean & Meyer, 1996
Local industry internationalization	"The extent to which home country firms in an industry have internationalized or partake in certain internationalization practices"	Fernhaber, McDougall & Oviatt, 2007
Global integration of industry	"The degree to which an industry competes on a global rather than multidomestic basis"	Fernhaber, McDougall & Oviatt, 2007
Industry venture capital	"The extent to which venture capital is invested in firms within an industry"	Fernhaber, McDougall & Oviatt, 2007
Regime of appropriability	"Ability of industry firms to capture the profits generated by an innovation in industry"	Fernhaber, McDougall & Oviatt, 2007

Based on the work of Chase and Tansik (1983), Armistead et al. (1995) suggested division of the company types on "pure manufacturing firms", "quasi-manufacturing firms", "mixed services" and "pure service firms" with the increasing degree of contact between the firm and the customer from the firs type to the last one.

There are several studies, which examine differences between service and manufacturing firms' innovation and internationalization processes (Castellacci 2008; Kathuria et al. 2008). Based on Day (1994) research, Raymond (2014) considers that manufacturing and service firms develop their strategic capabilities in order to enhance innovation and internationalization process, however represent it in different ways. Service firm use innovation as a step to internationalization, which is "inside-out" strategy. In contrast,

manufacturing firm internationalize for better understanding their customers and improving innovation capabilities, which represents “outside-in” strategy.

In addition, Raymond (2014) concluded that the age of the firm significantly more influence service firms, than manufacturing ones. Younger service firms have more export proclivity in comparison with more mature firms. Kathuria et al. (2008) mentioned that service and manufacturing firms have distinctive characteristics, thus they use different international strategies. It is more difficult for the service firms to internationalize, due to such factors, as inseparability, variability, and importance of contacts with customers. In addition, Winstead and Patterson (1998) stated that the process of going abroad demands understanding of local culture, thus it has particular risks for the service firms.

According to the industry life cycle model, the development of the industry may be divided into four stages – introduction, growth, maturity and decline (Grant, 2002). Andersson (2004) suggested that internationalization process depends on industry’s and firm’s stages of growth (Figure 7). Firms in mature industries, doing their first steps in internationalization, should prefer markets, close to them geographically. The situation in these industries is stable and will not have radical changes, thus firms may implement incremental learning process. For more experienced firms in mature industries the choice of the strategy depends on their competitors. In growing industries firms must rely on their internal resources, such as entrepreneurs, due to unpredictable situation on the growing market. Finally, in growing industries on later stages of internationalization firm should involve in dynamic cluster due to constant changes and high level of competition.

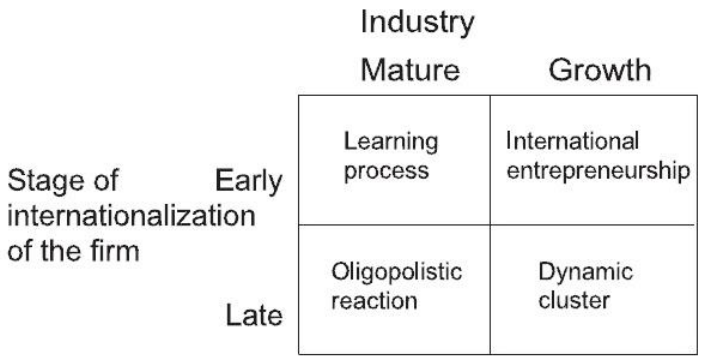

Figure 7. Stage of internationalization/Stage of industry growth (Andersson, 2004)

Based on the discussion above, the following hypotheses are stated:

H1. The higher industry competition can increase the probability of internationalization.

H2. The higher market turbulence can increase the probability of internationalization.

H3. The higher dependency of company innovation from the pressure from foreign stakeholders can increase the probability of internationalization.

3.5. Institutional factors

Institutions are widely spread arrangements of practices, technologies and rules, which are accepted by the society and consequences of its rejection will be costly (Lawrence et al. 2002). Peng, Wang and Jiang (2008) argued that in accordance with traditional industry- and resource-based view, most of the researchers underestimate the importance of the institutional-based view and see it only as "background". However, impact of the institutional context in innovation and internationalization may be rather significant, thus this topic demands further consideration. Public and government institution may influence the companies' new business activity in unfavorable way through the great amount of documentation, rigid requirements, slow process of official paper's consideration and other regulatory obstacles (Luo and Junkunc, 2008). The level of bureaucracy in Russia is quite high and inhibits the development of the companies.

Jormanainen and Koveshnikov (2012) defined that scientific literature consists of two types of institutional factors, which facilitate emerging market firms to internationalize – push and pull factors. The first one divided into two groups – positive and negative factors. Positive institutional factors are political and regulatory institutions, which facilitate the development and growth of the companies and encourage FDI activities. Negative factors force firms to expand abroad in order to avoid high domestic transaction costs, caused by capital market distortions, inefficient corporate ownership structure and high political risk. The main pull factor is searching for the sophisticated resources for successful competition on domestic and international market (Luo and Tung, 2007). High level of uncertainty and hostility of the

institutional context force firms to exploit their own social networks in order to provide successful internationalization (Kiss and Danis, 2010).

Williamson (2000) classified institutions into four categories, which are reflected on the Figure 8 below.

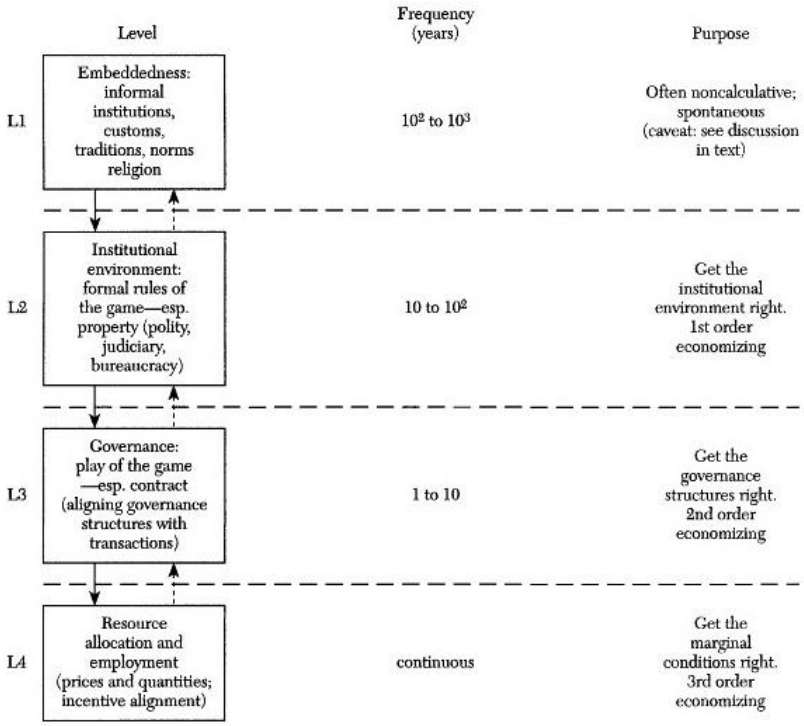

Figure 8. Categories of institutions (Williamson, 2000)

The first level, named as social embeddedness, includes informal institutions, such as customs, traditions and religion norms. The second is institutional environment with formal institutions – constitutions, laws and property rights. According to Williamson (2000), this level contains of "the executive, legislative, judicial, and bureaucratic functions of government as well as the distribution of powers across different levels of government". Third level represents governance. Williamson (2000) describes it as a way to create order, decrease conflict situation and achieve mutual aims. The final level is resource allocation.

Moving further, Volchek et al. (2013) in their work "Internationalization: Strategic responses of SMEs in Russia" describes five dimensions of institutional factors, which influence process of internationalization. The following Table 3 is based on these research findings.

Table 3. Five dimensions of institutional factors (Volchek et al., 2013)

Dimension	Example
Regulatory	Political instability World Trade Organization accession
Normative	Downfall of the paternalistic model of state-business relationship Corruption
Cognitive	Bounded cognition Demand for knowledge sharing
Cultural	High-power distance Importance of networking Over-patriotism
Conductive	Need for administrative resources and technological capabilities

The first three dimensions were originally introduced by Scott (1995). Stenholm et al. (2013) describes these dimensions as follows. Regulatory dimension related to regulations, policies, rules and laws and consider their influence on individuals and economic growth. The cognitive dimension reflects cognitive perception of reality and information by individuals. The normative dimension describes social norms and values, which affect individual's behavior. Fourth dimension, introduced by Volchek et al. (2013), related to mutually exclusive relationship between institution and cultural views. The last dimension is "an attempt to tease out the relationship between institutions and the type of opportunities that are exploited in a country" (Stenholm et al. 2013).

Considering regulatory dimension, it imposes government's actions, which may create favorable conditions for firms by eliminating regulations to lower entry barriers and decreasing market imperfections (Bruton, 2010). According to Volchek et al. (2013), normative dimension contains social value systems and may lead to difference between rights and permits of firms to access information; particularly in situation with Russian companies, lack of entrepreneurial culture in the society leads to the low rate of innovation activity.

Cognitive dimension related to the societal knowledge, mainly related to growing new business and finding new opportunities for development it both domestically and internationally (Volchek, 2013).

Stenholm et al. (2013) emphasized that conductive dimension reflects to the ability of the country to produce capabilities for the high level entrepreneurship. Cultural dimension, introduced by Volchek et al. (2013), reflects constraints and opportunities for the firm through cultural aspects, such as engagement in international business community, society conflicts and network perspectives. Looking deeper into dimensions, corruption, as part of normative dimension, is one of the most significant institutional factors in Russia (Tonoyan et al. 2010).

Eunni and Manolova (2012) provided survey with perceived favorability of three institutional pillars – regulatory, cognitive and normative – among BRIC economies. Data highlighted significant differences in cultural traditions and institutional norms between these countries. According to the results, normative dimension in Russia is less favorable, than in other BRIC countries, however the cognitive dimension facilities more the development of entrepreneurship in Russia (and China as well), than in Brazil and India. Eunni and Manolova (2012) mentioned that informal institutions in BRIC countries play important role due to inefficiency of formal governance institutions.

Estrin and Prevezer (2011) stated that each of BRIC countries has her own informal institution. In China it is a key role of entrepreneurship, in Russia is the tradition of “blat” (Andvig, 2006; Ledeneva, 1996), e.g. getting the job through the family ties, in Brazil it is an operation of the informal economy and in India it is an operation of business group, usually family owned. Also, authors argue that in China and India informal institution substitute inefficient formal institution, while in Russia formal institution are quite efficient, however such activities of informal institutions, as corruption, interfere with activity of formal institutions. In addition, in Brazil informal institutions perform well, however they are relatively restricted by the formal institutions.

Hermelo and Vassolo (2010) suggested that development of the institutional context will lead to the greater economic performance of the companies in emerging economies. It is possible through the four types of competition – price-quality, know-how and timing, strongholds, and deep pockets. The first competition reflects interaction of new players due to favorable institutional conditions, thus it will increase the level and quality of the competition. Improvement in the intellectual property rights facilitate investments in new technologies and proceed to the know-how competition. According to Hermelo and Vassolo (2010), "improvements in factor markets and reduction of transaction costs will decrease advantages from vertical integration and group formation and, consequently, reduce barriers created by capital requirements and scale economies", which leads to the strongholds competition. Finally, institutional rules will prevent "deep pocket" effect of large corporations.

Descotes et al. (2011) stated that institutional changes influence different industries unequally. Service industries easily respond to the both formal and informal institutional modification. Manufacturing industries demand more sophisticated reforms for facilitation their activities, it usually require more investments and government intervention, thus could not be provided easily.

Based on the discussion above, the following hypotheses are stated:

H4. The higher innovation potential of the firm and availability of knowledge can increase the probability of internationalization.

H5. The higher dependency of company innovation process from lack of resources and capabilities for high level entrepreneurship can increase the probability of internationalization.

H6. The higher dependency of company innovation process from economic, political and financial risks can increase the probability of internationalization.

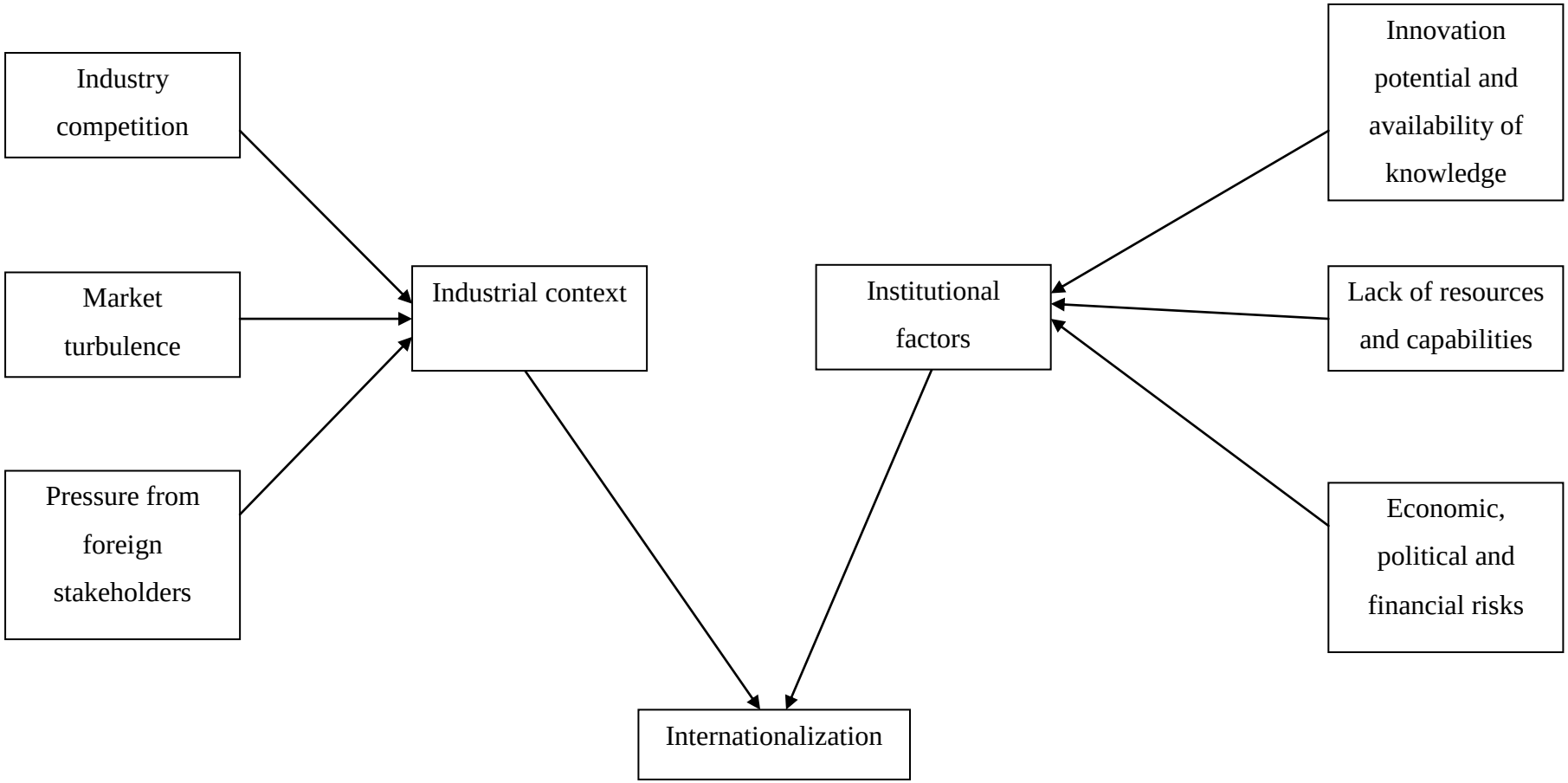

Figure 9. Factors, influence internationalization of the sample

4. Overview of Emerging Markets

Recently emerging countries captured significant attention by their rapid growth and great potential. Together with common traits, Russia has its own distinctions due to specific culture, traditions of the business development, industry orientations and institutional features.

4.1. BRIC-countries

Filippov (2009) stated that companies from the BRIC economies are usually named as "emerging multinationals". BRIC economies consist of four countries – Brazil, Russia, India and China. All of these countries have leading emerging economies, they are on approximately the same stage of development and usually considering together.

"PPP GNI (formerly PPP GNP) is gross national income (GNI) converted to international dollars using purchasing power parity rates" (World Bank, 2013). China has the biggest GNI (Table 4), however GNI per capita is lower, than in Russia and Brazil due to high population level. India on the second place of GNI and has the same situation, as China, thus this country has the lowest GNI per capita among BRIC countries. GNI per capita in Russia is the highest among emerging multinationals.

Table 4. Living standards in BRIC countries (World Bank, 2013)

	Population	GDP (current US$) Billion	GNI, PPP (current international $) Billion	GNI per capita, PPP (current international $)
Russia	143,499,861	2.096	3.328	23 190
Brazil	200,361,925	2.245	2.955	14 750
China	1,357,380,000	9.240	16.084	11 850
India	1,252,139,596	1.876	6.699	5 350

Annual GDP growth in China in 2012 was the highest among BRIC countries. Russia was on the third place, exceeded Brazil on 2.4% (3.4% and 1.0% respectively). Due to unfavorable political situation and financial crisis, in 2015 Russian indicators dropped significantly. According to World Bank forecast, this situation will straighten, however in the nearest future Russia will be far back to GDP growth among other BRIC countries.

China spent the biggest amount of money on research and development in 2011 – 1.84% of GDP (with the biggest GDP among BRIC countries). Russia and Brazil have relatively similar GDP, and also R&D expenditure – 1.09% and 1.21% respectively. Surprisingly, even with fast growing technology, India has the lowest indicator of R&D expenditure – only 0.81% of GDP (World Bank, World development indicators, 2011) (Figure 10).

Concerning patents applications in BRIC countries, in 2012 China strongly exceeded other emerging multinationals with 535 313 of patent applicants (only residents considered). Russia got 28 701 applications, India and Brazil stayed behind with 9 553 and 4 804 applicants respectively (World Bank, World development indicators, 2011).

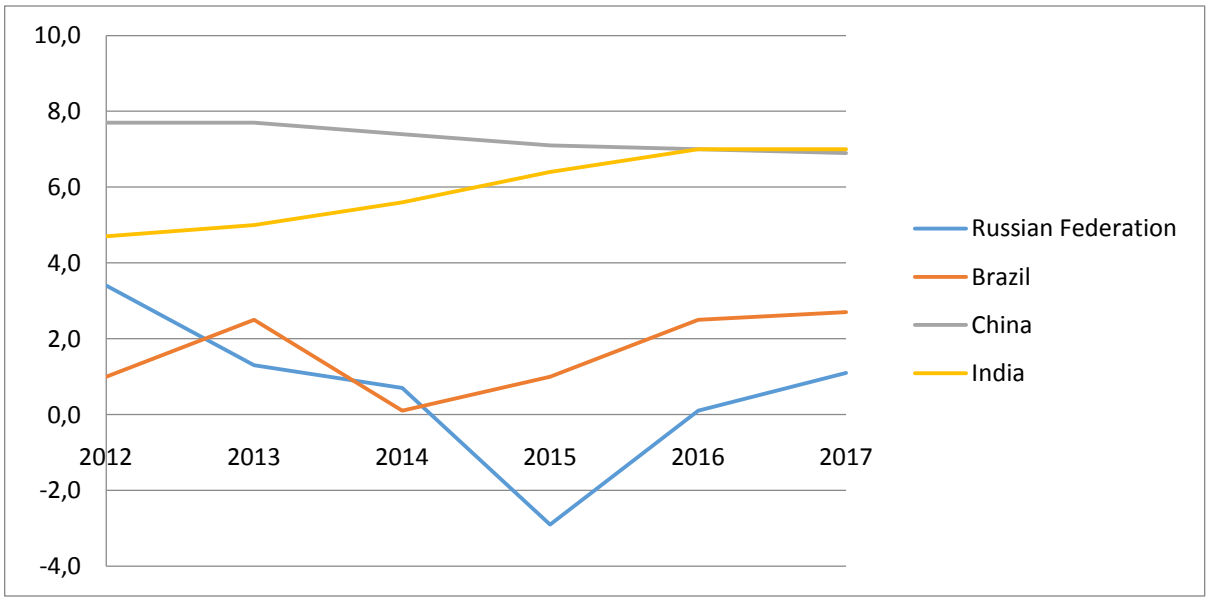

Figure 10. GDP % growth, annual (World Bank, 2013)

Although Russia is highly manufacturing country, service sector produces the maximum percent of GDP in Russia – 58,3%. Industry sector is significantly less – 37,5%. Share of agriculture is 4,2% (Figure 11).

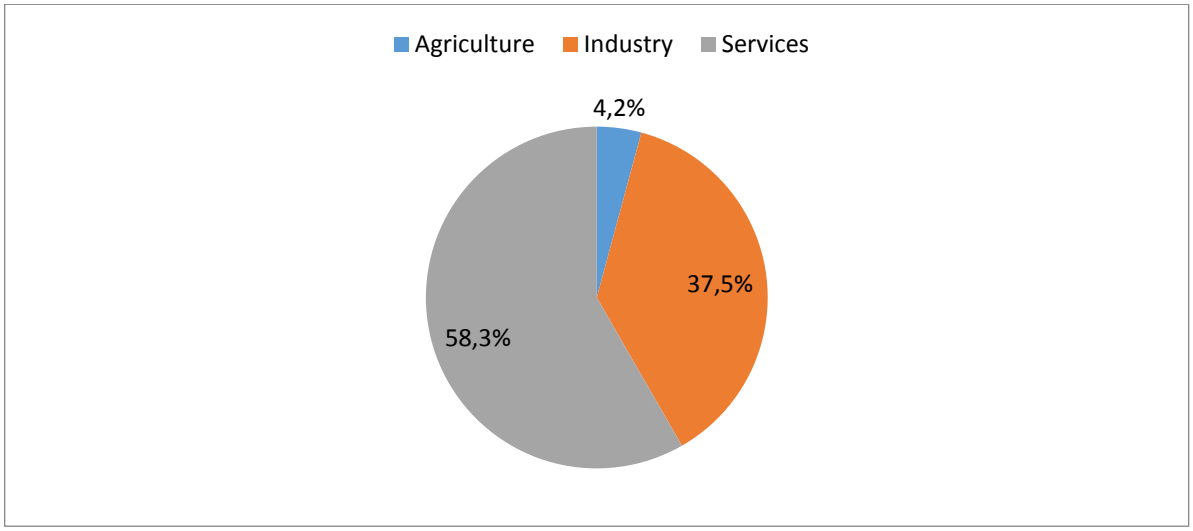

Figure 11. GDP – composition in Russia by sector (Central intelligence agency, 2013)

According to Filippov (2009), among BRIC economies Russia and China have similar features due to their highly centralized government and underdeveloped financial centers. The graphs 12 and 13 reflect the import and export situation in Russia during last 2005-2013 years in comparison with BRIC countries.

Russia is placed on the third place by import of goods and services in comparison with other BRIC countries. India increased its level of import from 2005 to 2012 and now on the first place. In contrast, China decreased share of import and shifted to the second place. Import of Brazil shows slow, but stable growth.

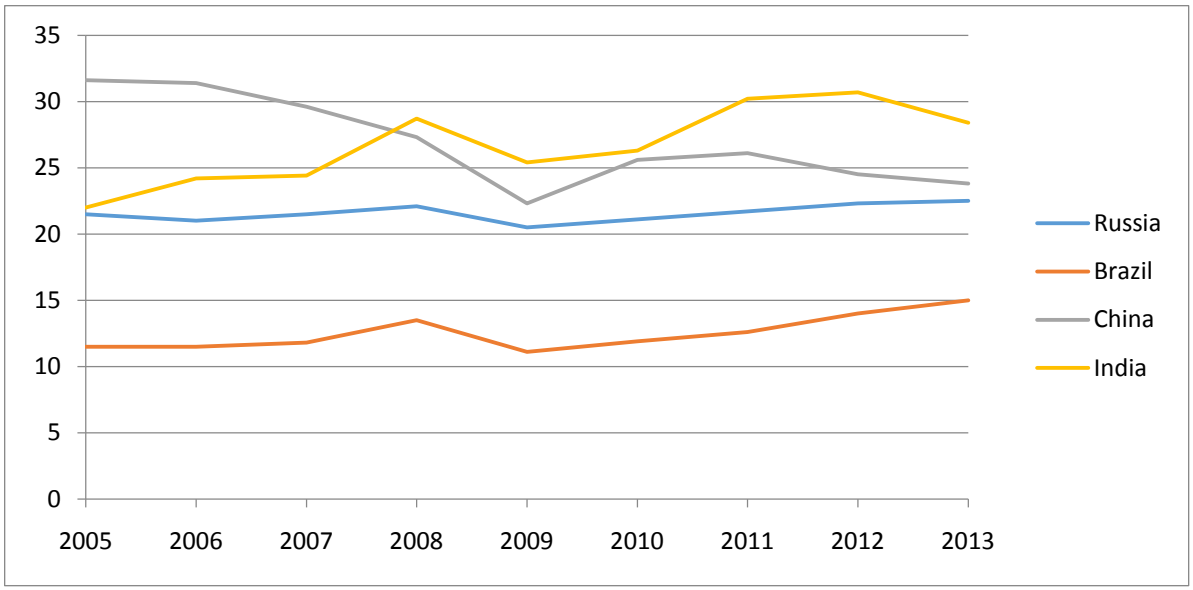

Figure 12. Imports of goods and services (% of GDP) (World Bank, 2013)

Export share in GDP of Russia and China decreased during last eight years on almost 8%. However, now Russia took the first place in export index. India shows stable growth during last 4 years and Brazil stays with almost the same share during these years.

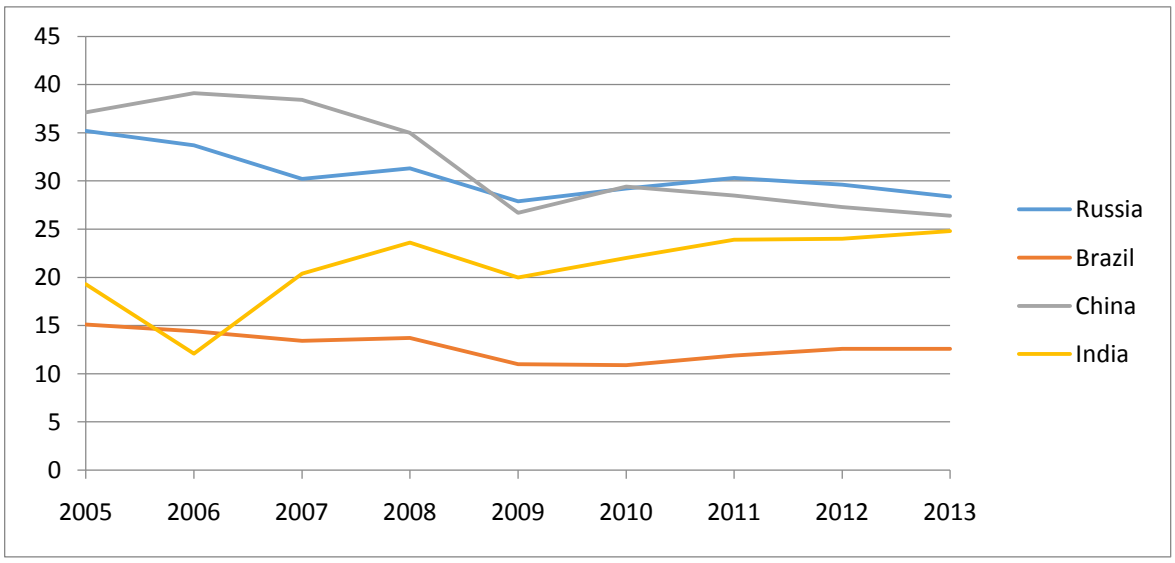

Figure 13. Export of goods and services (% of GDP) (World Bank, 2013)

4.2. Russia among BRIC-countries

Companies from emerging countries have a tendency to invest in resource-seeking activities in countries, which are close to them geographically, and then extent their presence further worldwide (Filippov, 2008). In recent years, there is a great interest of Russian companies for the internationalization of their activities. They are looking for a new technologies and innovation, however FDI with the aim to gain new technological decisions is not a common phenomenon (Filippov, S. 2008).

It is well known, that Russia has great stocks of natural resources, such as gas and oil. That is why many emerging Russian companies are in low R&D-intensive oil and gas sector, where R&D investment on average account for 1.6% of operating profit comparing to almost 20% in pharmaceuticals (Filippov, S. 2008)

"Russia seems to be the worst positioned among the BRIC countries on the innovation front" (Kaartemo, 2009). Schaffer and Kuznetsov (2007) analyzed World Bank study and concluded that productivity of Russian R&D sector is much more lower, than other countries on international markets.

Russia yield to the all BRIC countries in capacity for innovation and company spending on R&D (Figure 14). However, quality of scientific research institutions in Russia is quite high and on the same level with Brazil and India. No wonder that availability of scientists and engineers has the highest index in China and India, Russia took the third place.

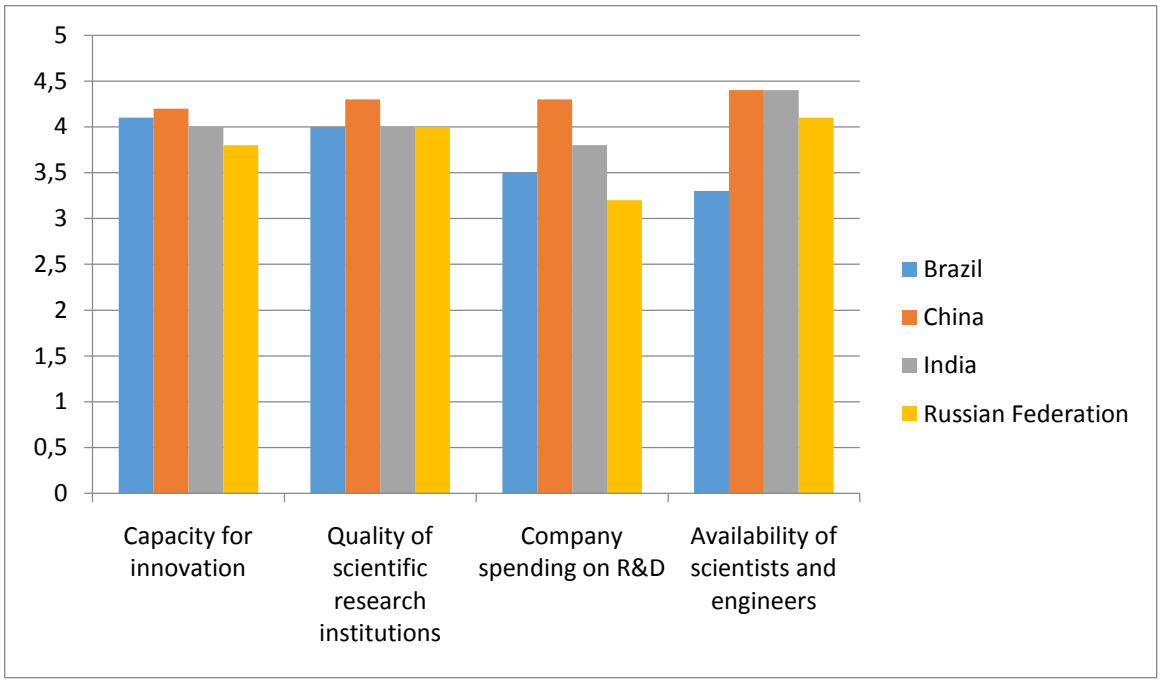

Figure 14. Innovation pillars of BRIC countries (Global Competitiveness report, 2014)

Innovation development of Russian companies is in the stage of active growth, however this process still proceeds quite slowly. According to the Global Innovation Index 2014, Russia ranks at the 49th place in comparison to the 62 at the 2013 year. However, previous two years these places were 51 at the 2012 and 56 at the 2011, which highlights unstable position of Russian companies in the innovation struggle with other, particularly Western, countries. Filippov (2008) claimed that there are two opportunities for Russian companies to get access to the new innovation technologies – through strategic alliance with Western company or by acquiring the technology developed one.

According to the Filippov (2012), due to the historical and mentality reasons, Russia has specific managerial style in contrast with classical Western style. For instance, Russians usually rely on group's opinion rather than on individual (Filippov, S., 2012) Therefore, there are difficulties with implementation of innovation and internationalization strategies. Giving explanation of the currently development patterns to the workers is significantly important for the consistent growth of the factory. It lets employees accept changes at the work processes more easily and also motivate them to contribute new ideas. Internationally experienced

managers do not need to rely on the superior market knowledge or commercial network of a local distributor to commercialize their product abroad. Their tenure abroad means that they already have their own personal networks and can evaluate them in comparison with the services offered by distributor (Burgel, 2000).

5. Empirical study

5.1. Explanation of the Variables and Methods

Based on the literature review in Chapter 3, the list of industrial and institutional variables, influencing innovation and internationalization was defined (Tables 2 and 3). The corresponding indicators were extracted from the questionnaire and used in the analysis. The operationalization of variables used in the analysis is presented in the Table 5.

Variables "R&D performance" and "International vs. not" are basic indicators of the companies' innovation and internationalization activities. "Development and launching new products or services in contrast with competitors" reflects competition as a part of industrial context. "Industry uncertainty" presents structural uncertainty (Luo & Tan, 1997) of the industry, including consumer taste, product and technology modifications. "Internal knowledge intensity" includes slills and resources, which are necessary for the development of new technologies. Variable "Innovativeness of the company" reflects factors, which are influence innovation processes in the company. Variable "Decision to implement innovation" examines which factors have impact on the implementation of developed innovations. "Innovation output" is considering results of the innovation acitivities of the company.

Table 5. Variables, used in analysis

Variable	Explanation	Measurement (scale)
R&D performance	Presence or absence of company's R&D performance	Binary
International vs. not	Presence or absence of company's international activity	Binary
Development and launching new products or services in contrast with competitors	Competition in the industry	Attitude Likert scale (1-5)

Industry uncertainty	Consumer taste, product and technology modifications	Attitude Likert scale (1-5)
Internal knowledge intensity	Availability of the necessary knowledge resources inside the company	Attitude Likert scale (1-5)
Innovativeness of the company	Factors, influence innovativeness of the company	Attitude Likert scale (1-5)
Decision to implement innovation	Factors, influence decision to implement innovation	Attitude Likert scale (1-5)
Innovation output	Output as a result of innovation strategy	Attitude Likert scale (1-5)

For this study cluster analysis was chosen in order to define which type of firms, considering innovation and internationalization propensity, presented in the sample. Factor analysis applied to determine appropriate factors influence processes of innovation and internationalization in the sample and also reduce their amount to conduct regression analysis. After that, binary logistic regression analysis was implemented for examining the impact of industrial and institutional factors on clusters of firms.

5.2. Innovations in Russian Companies

162 firms out of 206 in the sample have R&D activities (78,6%). 184 companies launched new or significantly modified products (89,3%), 166 companies implemented new technologies (80,6%), and 129 companies developed marketing innovations (62,6%). Therefore, sample consists mostly of innovative companies.

Companies with different ownership forms facilitate mostly development of the product and service innovations, and technological or production process innovation (Figure 15). However, privatize firms also pay significant attention to the marketing innovation development (70%), while governmental companies have only 38% activity for this type. Organizational

innovation seems less attractive for new enterprises and privatized firms, however governmental companies pay more attention to this category. In contrast, technologies and innovations search and acquisition are not very important for governmental organizations.

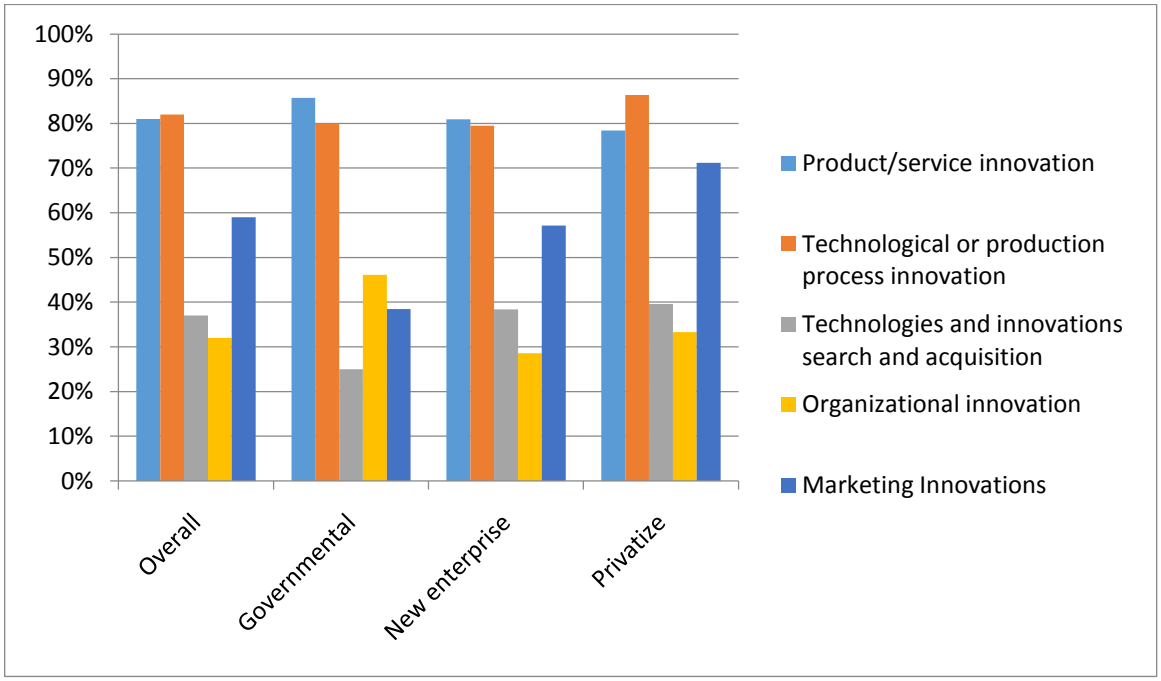

Figure 15. Innovation activity/ownership

Improvement of the production process (mean=4,2) is the major innovation goal for most of the industries (Figure 16). However, chemical, metallurgy and aircrafts industries mainly aim to increase quality through the innovation activity (mean=4,2). Marketing development is the significant goal for the telecommunication industry, as well, as for oil refinery (mean=4,4). Cost decrease is the less attractive among other innovation aims for most industries, except several, such as machinery and apparatus (4,6).

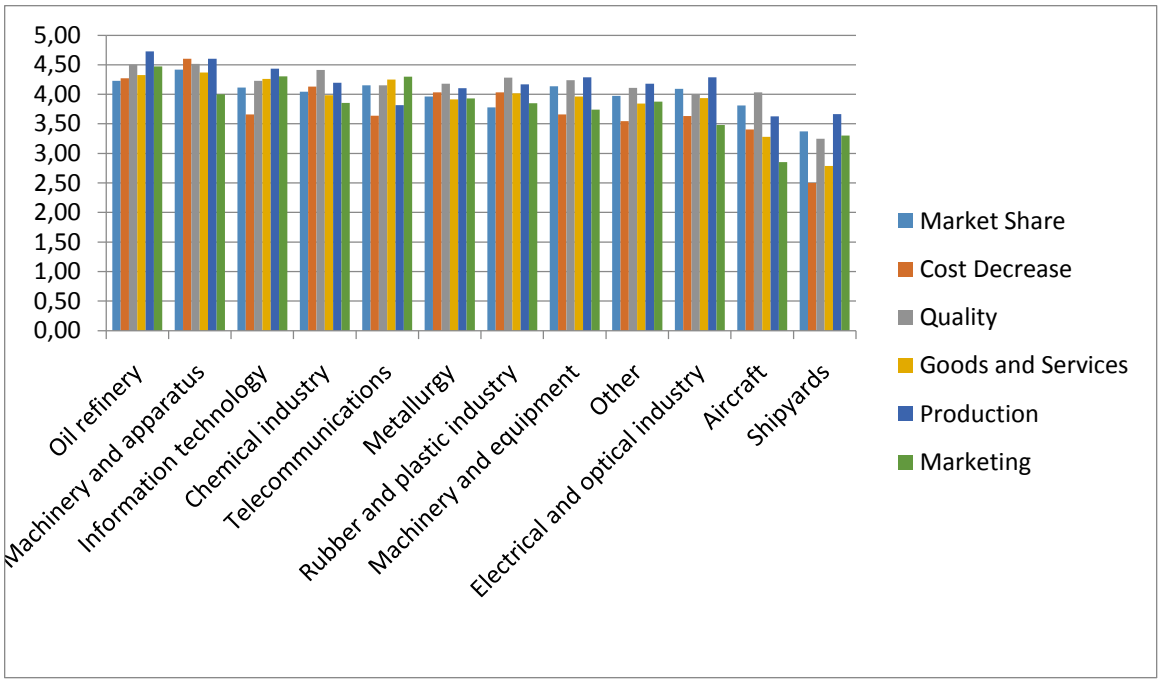

Figure 16. Goals of innovation/industry

5.3. Internationalization in Russian Companies

About half of the sample companies have no international experience (Figure 17). Approximately quarter of the respondents have significant international experience – more than 10 years. Rest of the group internationalized relatively recently, no longer than 10 years ago.

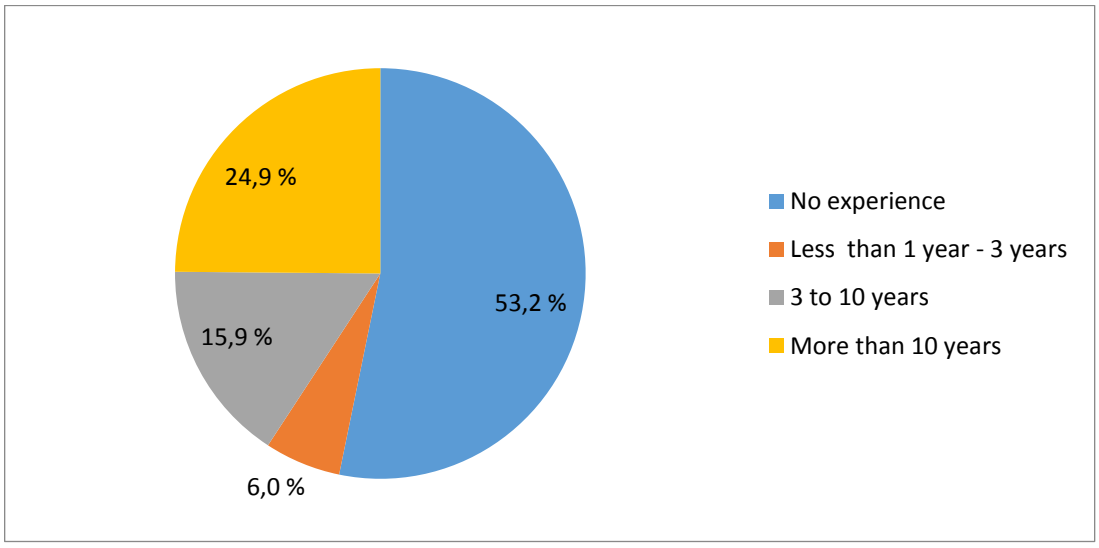

Figure 17. Share of companies' international experience

The main reasons to enter international market presented on the Figure 18. They are:

1. Business partners
2. Clients
3. Suppliers
4. Intermediaries
5. Strong competition on the home market
6. Acceptable level of competition on the target market
7. Saturated home market
8. Possibilities for sales on the target market
9. Knowledge of the foreign language of the target market
10. Knowledge of culture and business methods of the target market
11. Geographic proximity of the target market
12. Vertical industrial integration
13. Horizontal industrial integration

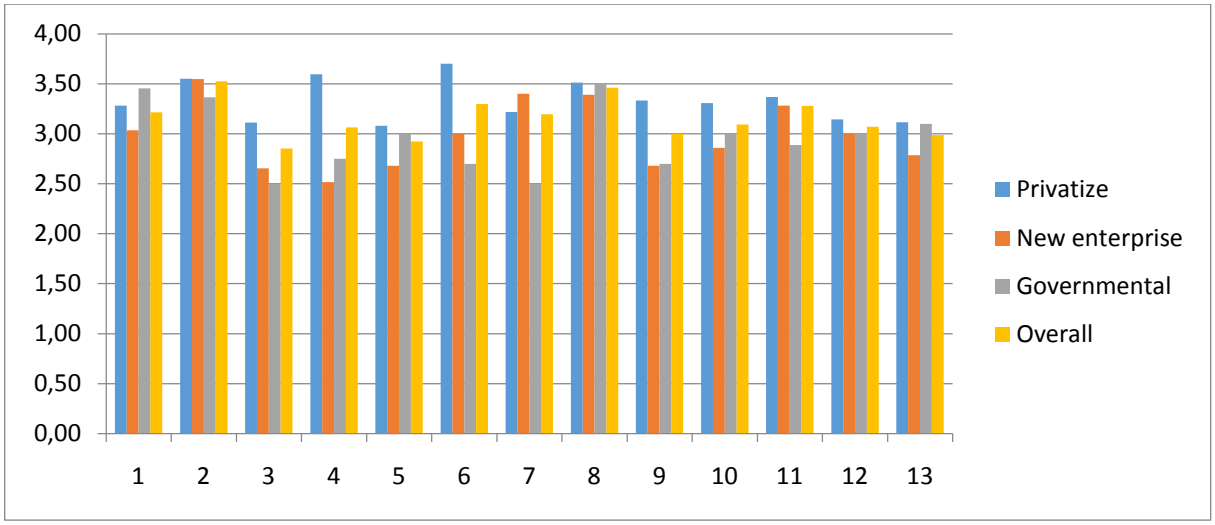

Figure 18. Ownership types of companies

The main reasons for the privatize companies to enter international market are intermediaries and acceptable level of competition on the target market. New enterprises chose clients, saturated home market and possibilities for sales on the target market as major aims for

internationalization. Governmental companies mostly guided by business partners, clients and possibilities for sales on the target market.

According to the cross-tabulation (Table 6), companies with any kind of new product development are more satisfied with export activities, than companies without innovations. Most companies with positive answers produced products as modification of the existing products or completely new only for the company. The reason for this may be difficulties with implementation disruptive innovations and prolong period of launching.

Table 6. Export satisfaction / New product development Cross-tabulation

Export satisfaction	Novelty of products/services			
	completely new for our company	completely new for Russian market	completely new for the world	modification of existing products or services
not satisfied	8%	0%	17%	16%
slightly satisfied	12%	8%	33%	16%
moderately satisfied	29%	50%	16%	53%
very satisfied	45%	25%	17%	8%
fully satisfied	6%	17%	17%	7%
Total	100%	100%	100%	100%

The situation with technologies (Table 7) is similar to the new product development, companies with any kind of new technologies are more satisfied with export activities, than companies without it. However, companies, satisfied by their export activity, have also technologies completely new for Russian market.

Table 7. Export satisfaction / New technologies Cross-tabulation

Export satisfaction	Novelty of technologies			
	completely new for our company	completely new for Russian market	completely new for the world	modification of existing products or services
not satisfied	11%	5%	2%	7%
slightly satisfied	11%	9%	8%	13%
moderately satisfied	34%	32%	80%	50%
very satisfied	34%	45%	7%	16%
fully satisfied	10%	9%	3%	14%
Total	100%	100%	100%	100%

Most of international companies in the sample are from Machinery (19%), Metallurgy (24%) and Optic and electric equipment production (11%) (Table 8). Most of non international companies are from Electric equipment production (13%), Chemical indudstry (11%) and IT (10%).

Table 8. Industry / International vs. not (dummy) Cross-tabulation

Industry	International	Non international
Electric equipment production	6%	13%
Optic and electric equipment production	11%	9%
Plastic and gummy wares production	3%	5%
Aviation devices construction	5%	3%
Chemical indudstry	9%	11%
Machinery	19%	9%
IT	2%	10%
Telecommunications	3%	5%
Oil industry	4%	6%
Metallurgy	24%	9%
Ship construction	0%	2%
Other	14%	18%
Total	100%	100%

According to cross-tabulation (Table 9), high tech industries are less internationalized, than medium and low tech industries.

Table 9. Type of industry / International vs. not (dummy) Cross-tabulation

Industry	International	Non international	Total
high tech	42%	58%	100%
medium tech	49%	51%	100%
low tech	49%	51%	100%

5.4. Innovative and International Companies in Russia - Cluster analysis

For the cluster analysis two variables were used. The first one is binary categorical variable, which reflect is particular firm international or not. It is coded one (yes, international) and zero (no, not internaitonal) respectively. The second variable, also categorical and binary, is implementation of R&D in the company, which presented as 0 (not implemented) and 1 (implemented).

Cluster analysis allowed to classify firms into four groups (Table 10). The first one is already internationalized companies without performance of R&D department - International non innovators. This is the smallest group, it takes 5,4 % of the whole sample or 11 firms. The second group is non international companies with lack of R&D performance, 16,3 % of the sample (33 firms) - Domestic non-innovators. Third group represents not international companies with R&D performance. It is 36,9 % of the sample or 75 companies - Domestic Innovators. The last cluster is international companies with R&D performance, the biggest cluster with 41,4 % of the sample (84 firms) - International Innovators.

Comparing Cluster 1 and Cluster 4 – international non innovators and innovators show that more than 80% of international firms reports high performance in innovation.

Table 10. Clusters

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Name of cluster	International non innovators	Domestic non-innovators	Domestic Innovators	International Innovators
% (N)	5,4% (11)	16,3% (33)	36,9% (75)	41,4% (84)
R&D performance	No	No	Yes	Yes
International vs. not	Yes	No	No	Yes

Analyzing distribution of the companies of different industries among clusters (Table 11), most respondents are from Electric equipment production, Optic and electric equipment production, Chemical industry, Machinery and Metallurgy. Plastic and gummy wares production, Aviation devices construction and Ship construction have less number of representatives. Most of companies from considerable industries placed at the 3d and 4th clusters. Exception is Chemistry, which has the similar amount of companies in 2nd and 3d clusters, and Telecommunications, companies from which distributed mostly between 2nd, 3d and 4th clusters.

Table 11. Industry / Clusters Cross-tabulation

Industry	Clusters				Total
	International non innovators	Domestic non-innovators	Domestic Innovators	International Innovators	
Electric equipment production	2%	5%	53%	40%	100%
Optic and electric equipment production	1%	5%	39%	55%	100%

Plastic and gummy wares production	3%	7%	60%	30%	100%
Aviation devices construction	7%	8%	35%	50%	100%
Chemical indudstry	5%	15%	18%	62%	100%
Machinery	11%	11%	30%	68%	100%
IT	7%	8%	70%	15%	100%
Telecommunications	5%	30%	42%	22%	100%
Oil industry	10%	16%	43%%	31%	100%
Metallurgy	2%	3%	30%	65%	100%
Ship construction	9%	70%	11%	19%	100%
Other	5%	5%	59%	31%	100%

According to the European Union Classification (2015), Micro companies have 1-9 employees, Small companies have 10-49 employees, Medium-sized companies consists of 50-249 employees and Large companies have more than 250 employees. Considering size of the company (Table 12), all the clusters have more large companies, than small companies.

Table 12. Employees number / Clusters Cross-tabulation

Employees number	Clusters			
	International non innovators	Domestic non-innovators	Domestic Innovators	International Innovators
Small	9%	21%	13%	5%
Medium	36%	39%	37%	26%
Large	55%	40%	50%	69%
Total	100%	100%	100%	100%

International non innovators mostly have JSC (Table 13), biggest part of Domestic non innovators consists of private companies as well, as Domestic Innovators. International Innovators also have more JSC, however share of private companies is high enough.

Table 13. Ownership form / Clusters Cross-tabulation

Ownership form	Clusters			
	International non innovators	Domestic non-innovators	Domestic Innovators	International Innovators
State	4%	3%	2%	1%
Privatized	5%	6%	6%	10%
JSC	62%	35%	41%	49%
Private	29%	55%	51%	40%
Total	100%	100%	100%	100%

Most of companies in all four clusters are rather joint stock companies (JSC) or private companies. 4th cluster has significant amount of JSC in contrast with other types of companies. Table 14 shows which strategies (Miles & Snow, 1978) different clusters prefer. The strategies were formulated as follow:

1. We attempt to locate and maintain a secure niche in a relatively stable product area. We tend to offer a more limited range of products than our competitors, and try to protect our domain by offering higher quality, superior service, lower prices, and so forth. Often we are not at the forefront of developments in our industry. We tend to ignore the industry changes that have no direct influence on current areas of operation and concentrate instead on doing the best job possible in a limited area.
2. We operate within a broad product-market domain that undergoes periodic redefinition. We value being first in new product and market areas even if not all of these efforts prove to be profitable. We respond rapidly to early signals concerning areas of opportunity and these responses often lead to a new round of competitive actions. However, we may not maintain market strength in all the areas we enter.
3. We attempt to maintain a stable limited line of products while at the same time moving quickly to follow a carefully selected set of the more promising new developments in our industry. However, by carefully monitoring the actions of major competitors in areas compatible to with our stable product-market base, we can frequently enter by second in with a more cost-efficient product.
4. We do not appear to have a consistent product-market orientation. We are usually not as aggressive in maintaining established products and markets as our competitors not are we willing to take as many risks as other competitors. Rather, we respond in those areas where we are forced to by environmental pressures.

Table 14. Strategy (Miles & Snow, 1978) / Clusters Cross-tabulation

Strategy	Clusters			
	International non innovators	Domestic non-innovators	Domestic Innovators	International Innovators
1	10%	62%	28%	29%
2	35%	20%	49%	40%
3	45%	13%	18%	18%
4	10%	5%	5%	3%
Total	100%	100%	100%	100%

Every cluster has the smallest number of companies with last type of strategy. In second cluster firs strategy prevails. It indicates that not innovative and not internationalized companies tend to secure their position and choose stable strategy without radical changes. Third and fourth clusters chose mostly strategy with broad product-market domain, however significant number of companies in these clusters smoothly spread their preferences between first and third strategies.

5.5. Comparison of Clusters (Industrial context on clusters) ANOVA

Results of the ANOVA for industrial context are presented in the Table 15 below. Impact of the different parameters is distinctive, some of the indicators significantly influence clusters and some of them have no influence on it. Findings revealed, that International Innovators may predict product modifications on the market better, than International non innovators (mean 3,9 and 3,0 respectively), which may be explained by performance of R&D department in the International Innovators. In contrast, International non innovators claimed that they better follow consumer needs, than International Innovators (mean 4,5 and 4,0 respectively), which may reflect conservative consumer views, however this factor has no significant influence on clusters. It is expected that technologies of the both Domestic and International Innovators better reflect latest trands in the industry, than technologies of non innovators (3,7/3,7 and 3,2/3,1 respectively). All companies are operating on Russian market, thus indicators of pressure from Russian competitors, consumers and suppliers have similar value for clusters in each category. However, there is distinction between categories, pressure from Russian competitors and pressure from Russian consumers were evaluated higher (total mean 3,6 and 3,5 respectively), than pressure from Russian suppliers (total mean 2,5).

Table 15. ANOVA Industrial context

Industrial context	Clusters										F	Sig.
	1		2		3		4		Total			
	International non innovators		Domestic non-innovators		Domestic Innovators		International Innovators					
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N		

Our technologies/products are substitutes for new technologies/products	3,0000	11	2,6452	31	3,2029	69	3,3659	82	3,1710	193	3,180	,025
We often can predict the nature of product modification on our market	3,0000	11	3,1515	33	3,4928	69	3,8795	83	3,5714	196	4,604	,004
We consider that we follow the customers' needs when developing new products or services	4,5000	10	4,1429	28	4,2973	74	3,9639	83	4,1436	195	1,776	,153
Our technologies always reflect the latest trends in the industry	3,2222	9	3,1000	30	3,6901	71	3,7250	80	3,5895	190	2,437	,066
Pressure from Russian competitors	3,2727	11	3,8125	32	3,5270	74	3,6265	83	3,6000	200	0,576	,632
Pressure from Russian consumers	3,6364	11	3,7419	31	3,3836	73	3,5301	83	3,5152	198	0,658	,579
Pressure from Russian suppliers	2,0909	11	2,5312	32	2,3425	73	2,6341	82	2,4798	198	0,901	,442

5.6. Comparison of Clusters (Institutional context on clusters) ANOVA

Results of the ANOVA for institutional environment are presented in the Table 16 below. Surprisingly, according to findings, organizational inflexibility inside the company more influence International Innovators (mean 3,3) compare to Domestic Innovators (mean 2,5), Domestic non innovators (mean 2,8) and International non innovators (mean 2,5). Governmental regulations and standards requirements have impact on Domestic non

innovators (mean 3,5) and International Innovators (mean 3,6) rather, than on International non innovators (mean 2,9) and Domestic Innovators (mean 3,1).

Table 16. ANOVA Institutional context

Industrial context	Clusters										F	Sig.
	1		2		3		4		Total			
	International non innovators		Domestic non-innovators		Domestic Innovators		International Innovators					
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N		
Our company is very active in implementing new technologies	2,8889	9	3,1000	30	3,7222	72	3,6750	80	3,5654	191	3,181	,025
Our company uses up-to-date technologies in its business field	3,1111	9	3,4333	30	3,9452	73	3,9125	80	3,8125	192	2,731	,045
Our company has resources necessary to develop new technologies	2,8889	9	2,9000	30	3,6027	73	3,7342	79	3,5131	191	4,567	,004
Organizational inflexibility inside the company	2,5455	11	2,8182	33	2,4722	72	3,2651	83	2,8643	199	4,838	,003
No sufficient IT resources	2,8182	11	3,0303	33	2,4861	72	3,1463	82	2,8687	198	3,408	,019
Government regulation and standards requirements	2,9091	11	3,4545	33	3,0685	73	3,6265	83	3,3550	200	3,215	,024

Our company has access to the knowledge necessary to develop new technologies	3,3333	9	3,2069	29	3,8356	73	3,7375	80	3,6754	191	2,645	,051

5.7. Factor analysis

Factor analysis aims to discover factors for the regression analysis and reduce the amount of these factors. From the 20 different industry variables (Fernhaber, McDougall & Oviatt, 2007) the most appropriate and indicating for the innovation and internationalization were chosen - ***Industry competition and Industry uncertainty***. Also, three important questions were analyzed - what influence the innovativeness of the company, what influence the most decision to implement innovations and outputs of the innovation. Variables were measured through the Likert scale form 1 – "not agree" to 5 – "absolutely agree". As an extraction method principle component method was applied. For rotation Varimax method was used.

According to the theory considered above, indicators of industry competition allow to distinguish different entry motives between industries. Foreign presence facilitates industry competition by displacing part of the incumbents (allocation efficiency) and forcing the rest of the incumbents to improve their quality (technical efficiency) (Caves, 1974, cited in Chung, 2001). In order to acquire factor Industry competition, the variable *Development and launching new products or services in contrast with competitors* was analyzed (Table 17).

As a result, two factors were identified. The first one is *industry competition concerning quality of the new products and services development* and the second – *industry competition in product and service distribution*.

Table 17. Factor analysis: industry competition

Item	Rotated loadings	
	Factor 1	Factor 2
Our attempts in new product/service development allow us to have leading position on the market	,740	,242
Our abilities to constantly improve product or service characteristics are higher than our competitors have	,737	,253
We develop new products or services better than our competitors	,732	,208

We have more unique characteristics of products/services that our competitors	,707	,283
We launch the new product/ service or start to get the profit from its selling faster than our competitors	,690	,348
We consider that we follow the customers' needs when developing new products or services	,637	,006
Our attempts to develop new products or services usually DON'T lead to our objectives	-,448	,403
Our system of new product/services distribution is better than our competitors' distribution system	,231	,838
We have closer relationships with our intermediaries when launching new products/services to the market	,214	,816
Our distribution programs are very important for successful selling our new products	,137	,766
When launching new products or services we can build the relationships with the intermediaries in distribution channels better than our competitors	,334	,726
Cum %	31,257	58,650

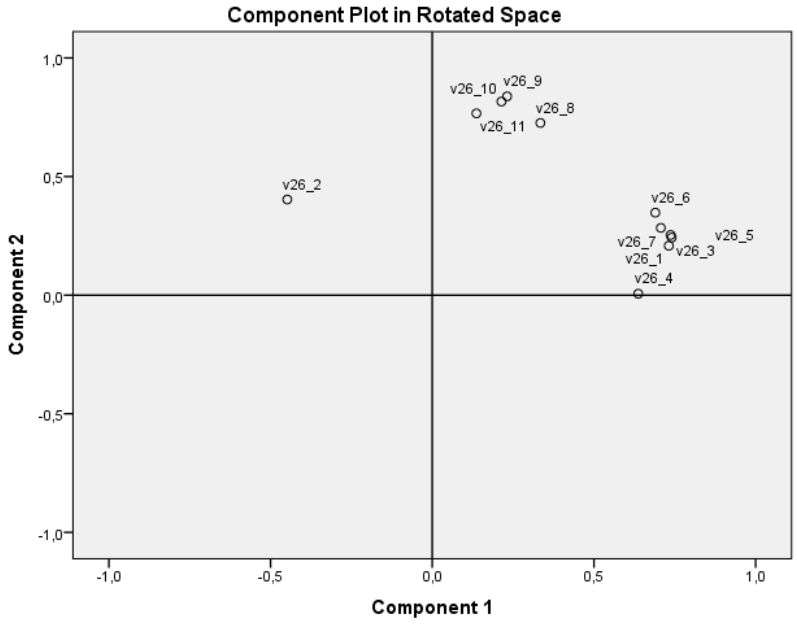

Figure 19. Factor analysis: industry competition

Item "Our attempts to develop new products or services usually DON'T lead to our objectives" has similar values for both factors and stand out of the groups, which is clearly highlighted on the Figure 17. Factor analysis: industry competition, thus it was excluded from further analysis. Two variables, which were defined from the factor analysis, as well, as their components and scales reliabilities, are presented in Table 18 below.

Table 18. Industry competition variables

Variable	*Item-Total Correlation*	*Cronbach's Alpha if Item Deleted*
Industry competition concerning quality of the new products and services development (alpha = 0,845)		
We develop new products or services better than our competitors	,649	,815
Our attempts in new product/service development allow us to have leading position on the market	,668	,811
We consider that we follow the customers' needs when developing new products or services	,440	,853
Our abilities to constantly improve product or service characteristics are higher than our competitors have	,704	,804
We launch the new product/ service or start to get the profit from its selling faster than our competitors	,652	,814
We have more unique characteristics of products/services that our competitors	,641	,816
Industry competition in product and service distribution (alpha = 0,853)		
When launching new products or services we can build the relationships with the intermediaries in distribution channels better than our competitors	,656	,828
Our system of new product/services distribution is better than our competitors' distribution system	,770	,781
We have closer relationships with our intermediaries when launching new products/services to the market	,738	,794
Our distribution programs are very important for successful selling our new products	,618	,846

According to the Cronbach's Alpha, reliability of the analysis is higher, than variable "We consider that we follow the customers' needs when developing new products or services" is not included.

Industry uncertainty explains structural uncertainty and scenarios of the industry growth (Luo & Tan, 1997). Through the factor analysis variety of variables measuring ***Industry uncertainty*** was reduced to the three factors (Table 19). The first factor is *technological changes and product modifications*. It shows market transformation during last years. The second factor is *market complexity*, which reflects essential market's problems. The third factor is *consumer preferencies* – is it easy to define or not and how quickly should company react in order to be competitive. As a whole, these three factors explain market turbulence (Table 20).

Table 19. Factor analysis: industry uncertainty

Item	Rotated loadings		
	Factor 1	Factor 2	Factor 3
There were a lot of changes of the product on our market for the last five years	,770	,115	,122
There is a high probability for improvement of the product on our market these two years	,755	,229	,097
Significant technological innovations appear often on our market	,747	,207	,050
Our customers constantly search for new products	,692	,094	,009
Our market experienced significant technological changes in last three years	,675	,139	,339
We often can predict the nature of product modification on our market	,495	,485	,207
Our technologies become out-of-date fast	,454	,023	,285
Consumer tastes on our market can be identified rather clear	,210	,832	,117
The demand on our market is easy to predict	,134	,826	,046
Sometimes our customers are sensitive to price but in general they are not sensitive	,227	,464	,380
On our market consumer product preferences change not so often during the time	-,253	,299	,717
Changes in consumer preferences are difficult to predict on our market	,382	-,400	,666
Our technologies/products are substitutes for new technologies/products	,409	,224	,523
We notice the demand for our products or services from the customers that didn't buy our products before	,349	,176	,414
Cum %	26,558	42,939	55,999

Variable “We often can predict the nature of product modification on our market” has similar values for two factors, thus it is eliminated from further analysis. The indicators of communality for items “Our technologies become out-of-date fast” and “We notice the demand for our products or services from the customers that didn’t buy our products before” are less than 0,5, which means their poor presentation in factor analysis.

Table 20. Industry uncertainty variables

Variable	*Item-Total Correlation*	*Cronbach's Alpha if Item Deleted*
Technological changes and product modifications (alpha = 0,824)		
Our customers constantly search for new products	,533	,816
Our market experienced significant technological changes in last three years	,622	,789
Significant technological innovations appear often on our market	,636	,785
There is a high probability for improvement of the product on our market these two years	,638	,785
There were a lot of changes of the product on our market for the last five years	,673	,773
Market complexity (alpha = 0,813)		
Consumer tastes on our market can be identified rather clear	,685	
The demand on our market is easy to predict	,685	.
Consumer preferencies (alpha = 0,475)		
Changes in consumer preferences are difficult to predict on our market	,346	,282
On our market consumer product preferences change not so often during the time	,209	,517
Our technologies/products are substitutes for new technologies/products	,338	,303

Internal knowledge intensity reflects availability of the inner resources and skills, necessary to improve existing technologies and develop new methods. ***Internal knowledge intensity*** divided into two factors (Table 21). The first one belongs to the *availability of the necessary resources and knowledge*, the second shows *innovation potential*.

Table 21. Factor analysis: internal knowledge intensity

Item	Rotated loadings	
	Factor 1	Factor 2
Our technologies always reflect the latest trends in the industry	,800	,238
Our company has access to the knowledge necessary to develop new technologies	,796	,281
Our company has resources necessary to develop new technologies	,777	,181
Our company uses up-to-date technologies in its business field	,713	,309
Our company has access to the knowledge necessary to improve existing technologies	,680	,428
Our employees has resources necessary to improve existing technologies	,640	,398
Our employees possess skills necessary to develop new technologies	,596	,473
Our company is very active in implementing new technologies	,587	,530
We are continuously seeking for new and promising technologies	,215	,826
Our company often develops new manufacturing methods	,343	,745
We integrate in our technological processes both internally developed and acquired technologies	,188	,743
Our company often adopts new technologies to improve production process	,516	,700
Our employees possess skills necessary to improve existing technologies	,543	,582
Our company develops products using new technologies	,555	,560
Cum %	35,905	64,773

Items “Our employees possess skills necessary to develop new technologies”, “Our company is very active in implementing new technologies”, “Our employees possess skills necessary to improve existing technologies” and “Our company develops products using new technologies” have similar values of communality for two factors (Table 22), which allow to eliminate them from further analysis.

Table 22. Internal knowledge intensity variables

Variable	Item-Total Correlation	Cronbach's Alpha if Item Deleted
Availability of the necessary resources and knowledge (alpha = 0,892)		
Our company uses up-to-date technologies in its business field	,704	,874
Our technologies always reflect the latest trends in the industry	,743	,867
Our company has access to the knowledge necessary to develop new technologies	,744	,868
Our company has access to the knowledge necessary to improve existing technologies	,680	,877
Our company has resources necessary to develop new technologies	,719	,871
Our employees has resources necessary to improve existing technologies	,677	,878
Innovation potential (alpha = 0,855)		
Our company often adopts new technologies to improve production process	,763	,788
Our company often develops new manufacturing methods	,736	,799
We are continuously seeking for new and promising technologies	,709	,811
We integrate in our technological processes both internally developed and acquired technologies	,589	,860

According to the Cronbach's Alpha, reliability of the research is higher, than variable “We integrate in our technological processes both internally developed and acquired technologies” is not included into analysis.

Variable ***Innovativeness of the company*** reflects factors, influence the innovation actions of the company (Table 23). The first factor is *lack of resources internally*. The second factor is *economic and political risks*. The third factor is *financial institutional factors (external)* (Table 24).

Table 23. Factor analysis: innovativeness of the company

Item	Rotated loadings		
	Factor 1	Factor 2	Factor 3
Organizational inflexibility inside the company	,862	-,025	,041
No enough information on markets and consumers' needs	,835	,112	,081
No sufficient IT resources	,832	-,003	,099
No highly qualified personnel	,722	-,107	,106
No feedback from consumers concerning new products and services	,709	,313	,042
High innovation costs	-,134	,844	,173
Economic risks	,098	,782	,183
Government regulation and standards requirements	,481	,501	-,048
Difficult to get loans for inventing them into innovation projects	,138	,058	,904
High interest rates	,064	,278	,865
Cum %	34,396	52,181	68,803

Variable "Government regulation and standards requirements" has similar communality for two factors, which indicates its poor presentation in further analysis. Thus, this variable is eliminated from the further consideration.

Table 24. Innovativeness of the company

Variable	*Item-Total Correlation*	*Cronbach's Alpha if Item Deleted*
Lack of resources internally (alpha = 0,863)		
Organizational inflexibility inside the company	,772	,811
No enough information on markets and consumers' needs	,736	,821
No sufficient IT resources	,740	,819
No highly qualified personnel	,587	,858
No feedback from consumers concerning new products and services	,583	,858
Economic and political risks (alpha = 0,717)		
Economic risks	,558	.
High innovation costs	,558	.
Financial institutional factors (external) (alpha = 0,801)		
Difficult to get loans for inventing them into innovation projects	,669	.
High interest rates	,669	.

Variable ***Decision to implement innovation*** divided into three factors (Tables 25-26) – *international threat, control of the products, domestic threat*.

Table 25. Factor analysis: decision to implement innovation

Item	Rotated loadings		
	Factor 1	Factor 2	Factor 3
Pressure from competitors on international market	,844	,087	,073
Pressure from foreign consumers	,803	,159	,140
Pressure from foreign	,746	,052	,316

competitors in Russia			
Pressure from foreign suppliers	,690	,532	-,061
Governmental policy on innovations	,185	,815	-,029
Better control for quality of the goods	-,084	,716	,299
Pressure from Russian suppliers	,421	,671	,103
Pressure from Russian consumers	,108	,088	,856
Pressure from Russian competitors	,184	,108	,771
Cum %	29,478	51,315	68,621

Table 26. Decision to implement innovation

Variable	*Item-Total Correlation*	*Cronbach's Alpha if Item Deleted*
International threat (alpha = 0,829)		
Pressure from competitors on international market	,716	,756
Pressure from foreign consumers	,689	,769
Pressure from foreign competitors in Russia	,623	,800
Pressure from foreign suppliers	,599	,809
Control of the products (alpha = 0,656)		
Governmental policy on innovations	,534	,469
Better control for quality of the goods	,428	,612
Pressure from Russian suppliers	,442	,594
Domestic threat (alpha = 0,618)		
Pressure from Russian consumers	,448	.
Pressure from Russian competitors	,448	.

Variable *Innovation output* shows output as a result of innovation strategy (Tables 27-28). The first factor is cooperation with external stakeholders, including government. The second factor is cost optimization and production improve.

Table 27. Factor analysis: innovation output

Item	Rotated loadings	
	Factor 1	Factor 2
Image of the company improved	,835	,227
Cooperation with external partners improved	,780	,178
Quality of products and services improved	,711	,318
The fulfilling governmental standards, requirements and regulations improved	,682	,308
The assortment of products and services expanded (product portfolio)	,652	,285
Company entered new markets - in Russia	,590	,291
Energy costs per unit decreased	,168	,833
Material costs per unit decreased	,303	,758
The negative impact on the environment and health risks decreased	,246	,666
Unit labour costs decreased	,221	,662
Production capacity increased	,415	,657
The production flexibility improved	,480	,640
Cum %	30,676	59,311

Table 28. Innovation output variables

Variable	*Item-Total Correlation*	*Cronbach's Alpha if Item Deleted*
Cooperation with external stakeholders, including government (alpha = 0,852)		
The assortment of products and services expanded (product portfolio)	,598	,834
Quality of products and services improved	,672	,821
Company entered new markets - in Russia	,539	,849
The fulfilling governmental standards, requirements and regulations improved	,615	,831
Image of the company improved	,761	,803
Cooperation with external partners improved	,656	,823
Cost optimization and production improve (alpha = 0,865)		
The production flexibility improved	,659	,843
Unit labour costs decreased	,574	,858
Production capacity increased	,705	,835
Material costs per unit decreased	,725	,831
Energy costs per unit decreased	,735	,830
The negative impact on the environment and health risks decreased	,573	,858

Results of the factor analysis presented in the Table 29. All the factors divided into industrial context, institutional factors, internal factors and innovation output. Industrial context consists of the biggest number of factors, it includes industry competition, technological changes, market complexity and international threat. Institutional factors contains lack of resources, economic, political and financial risks, availability of the necessary resources and innovation potential.

Table 29. Results of the factor analysis

Type	Factor	Name in SPSS
Industrial context	Industry competition concerning quality of the new products and services development	factor_1
Industrial context	Industry competition in product and service distribution	factor_2
Industrial context	Technological changes and product modifications	factor_3
Industrial context	Market complexity	factor_4
Industrial context	International threat	factor_10
Institutional factor	Lack of resources and the market imperfections	factor_7
Institutional factor	Economic and political risks	factor_8
Institutional factor	Financial institutional factors (external).	factor_9
Internal factor	Availability of the necessary resources and knowledge	factor_5
Internal factor	Innovation potential	factor_6
Innovation output	Cooperation with external stakeholders, including government	factor_11
Innovation output	Cost optimization and production improve	factor_12

5.8. Regression

The aim of the logistic regression is to explore the relationships between company's internationalization and industrial and institutional factors, which were defined in factor analysis. Logistic regression was implemented in order to answer two research subquestions "Which traits of the industrial context influence innovation and internationalization of the Russian companies?" and "Which institutional factors mostly influence innovation and internationalization of the Russian companies?" The question "Is company international or not?" was chosen for dependent variable and coded as "0 – No" and "1 – Yes".

Based on the literature review analysis and factor analysis results, the following hypotheses were stated in order to check through the logistic regression analysis:

H1. The higher industry competition both in NPD and commercialisation can increase the probability of internationalization (F 1 and 2)

H2. The higher industrial turbulence (market and technology) can increase the probability of internationalization (F 3 and 4)

H3. The higher innovation potential of the firm and availability of knowledge can increase the probability of internationalization (F 5 and 6)

H4. The higher dependency of company innovation process from lack of resources and market imperfection can increase the probability of internationalization (F 7)

H5. The higher dependency of company innovation process from economic, political and financial risks can increase the probability of internationalization (F 8 and 9)

H6. The higher dependency of company innovation from the pressure from foreign stakeholders (consumers, suppliers, competitors) can increase the probability of internationalization (F 10)

Before running the logistic regression, the possible correlations between the variables were identified. Similar variables from the same context show correlation between each other, which is predictable situation. However, institutional factors "Availability of the necessary resources and knowledge", "Innovation potential" and "Cooperation with external stakeholders, including government" correlate not only with the rest of the institutional

factors, but also with several industrial factors. This fact may be explained by considering these factors as borders, with some features of industrial context.

Results of the regression represent 70% of the questionnaire respondents, which are 146 companies. 108 representatives see their companies as non international and 95 claimed themselves as international. There are 3 missing cases and the statistics for the valid cases presented in the table 30. Model prediction accuracy is 72,6%.

Table 30. Descriptive statistic of the dummy International vs. not

International vs. not	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	108	52.4	108	52.4
1	95	47.6	203	100.00

Model fit statistics presented in the table 31. Both Cox & Snell and Nagelkerke values are far from 0, which means that fit of the model is good and that model is significant improvement over the null model.

Table 31. Model fit statistics – Cox & Snell / Nagelkerke

Step	Cox & Snell R Square	Nagelkerke R Square
1	,190	,254

Hosmer and Lemeshow Test indicates Sig. = 0, 104, which is more, than 0, 05. It shows that model is worthwhile. Results of the test reflect in the table 32.

Table 32. Model fit statistics – Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	13,224	8	,104

The main results of the logistic regression represented in the table 33.

Table 33. Results of the logistic regression

Variables in the Equation						
Factor	B	S.E.	Wald	df	Sig.	Exp(B)
Factor_1	-,223	,290	,588	1	,443	,800
Factor_2	-,289	,251	1,325	1	,250	,749
Factor_3	-,271	,275	,967	1	,326	,763
Factor_4	-,015	,217	,005	1	,943	,985
Factor_5	,236	,332	,504	1	,478	1,266
Factor_6	-,103	,295	,123	1	,725	,902
Factor_7	,720	,208	11,980	1	,001	2,054
Factor_8	-,369	,253	2,126	1	,145	,692
Factor_9	,019	,187	,010	1	,920	1,019
Factor_10	,531	,189	7,873	1	,005	1,700
Factor_11	,587	,339	3,000	1	,083	1,798
Factor_12	,012	,325	,001	1	,970	1,012
Constant	-2,240	1,457	2,364	1	,124	,106

As a result of regression model, two factors influence the dependent variable "Internationalization" and have significant contribution to the model – institutional factor Lack of resources and the market imperfections, and industrial factor International threat. B coefficient for both factors is positive (0,72 and 0,53 respectively), which means that significant lack of resources and increased level of the international threat will increase the proclivity of the company to internationalize.

Based on the results of the logistic regression, hypotheses H4. "The higher dependency of company innovation process from lack of resources and market imperfection can increase the probability of internationalization" and H6. "The higher dependency of company innovation from the pressure from foreign stakeholders (consumers, suppliers, competitors) can increase the probability of internationalization" are accepted and the other hypotheses are rejected.

Discussion and conclusions

The main aim of the research was to identify is there particular influence of industrial context and institutional factors on innovation and internationalization of the Russian companies. Extensive analysis of the scientific literature allowed to identify main factors influencing innovation and internationalization. These findings are presented in the table 34. Factors may be characterized as internal (such as size or age of the organization) and external (such as market turbulence and competition). According to the findings, higher dependence of the company from lack of resources, economic, political and financial risks may increase probability of the internationalization from the institutional side. At the same time, industrial context shows, that industry competition, market turbulence and higher dependency from the foreign stakeholders may also increase probability of the internationalization.

Table 34. Summary of the factors

Factors	Understanding	Authors
Size of the organization	Companies of different sizes use distinct ways for the internationalization and innovation	Mittelstaedt 2003, Xiaobao 2013, Pianta and Vaona 2007
Age of the firm	Mature companies have more proclivity to internationalize due to valuable experience	Johanson and Vahlne 2009
Country of origin	Geographical location, available resources and government incentives of the country may influence internationalization and innovation processes of domestic firms	Raymond et al. 2014
External factors	External expertise may help to avoid pitfalls and facilitate successful internationalization and innovation	Santos et al. 2004, Hitt et al. 1997
Market turbulence and uncertainty	Push companies to investigate new opportunities through innovation and internationalization	Filippov, S. 2011, Podmetina and Volchek, 2013

Institutional factors	Weak institutional system may negatively influence innovation and internationalization development of the firm	Yamakawa et al. 2008, Khanna et al. 2005, Smirnova et al. 2012
Competition	Positively facilitate innovation and internationalization processes of the firm	Kadochnikov et al. 2003, Podmetina, D. and Volchek, D., Filippov, S. 2011, Tsukanova 2012
Industrial context	Differ in case of internationalization potential	Porter 1980, Wang et al. 2011
Other factors	These factors include heterogeneity, internationalization modes, innovation performance, political and technological transformations, macro-economic obstacles, lacking managerial and business competencies, and differences in culture and business practices	Castellani and Zanfei 2007, Chetty and Stangl 2009, Tovstiga et al. 2004

This study aimed to answer thre research questions – one main question and two sub questions. As it was considered in the literature analysis, specific industry context may have a crucial role at the process of internationalization (Laurell et al. 2013). Thus, the first sub question of the study was:

"Which traits of the industrial context influence innovation and internationalization of the Russian companies?"

Literature review revealed several factors, including Industry competition and Industry uncertainty. Competition considered as main factor influence innovation (Kadochnikov et al. 2003) and export activity (Podmetina and Volchek, 2013). Uncertainty mostly influence decisions of Russian companies to invest in innovation activities (Filippov, 2011). Research findings showed significant influence of the competition on innovation and internationalization of the Russian companies.

According to the scientific studies, Russian institutional system is distint from other BRIC countries, its formal institution are quite efficient, however such activities of informal

institutions, as corruption, interfere with activity of formal institutions (Estrin and Prevezer, 2011). In order to deeper examine influence of both formal and informal institutions, the second sub question of the study was:
"Which institutional factors mostly influence innovation and internationalization of the Russian companies?"

Analysis of scientific literature defined five dimensions of the institutional factors – Regulatory, Normative, Cognitive, Cultural, and Conductive. As a result of empirical study, institutional factor "Lack of resources and the market imperfections" showed significant influence in contrast with other factors. This factor is related to the Conductive dimension and reflecting "relationship between institutions and the type of opportunities that are exploited in a country" (Stenholm et al. 2013).

The main question of the research was:
"How does the industrial context and institutional factors influence innovation and internationalization of the Russian companies?"

Research findings revealed positive influence both industrial context and institutional factors on innovation and internationalization of Russian companies. However, analysis of the scientific literature assumed more diverse distribution of the factors. This may be explained by the specific of particular sample, which does not cover all directions of the manufacturing in Russia.

Cluster analysis revealed four groups with different combinations of innovation and internationalization activities. The smallest group takes only 5,4 % of the sample and contains already internationalized companies without performance of R&D department – International non innovators. Most representative cluster is 41,4 % of the sample and consists of international companies with R&D performance Intenational innovators. These findings support the idea, that firms with high innovation intensity show also high internationalization intensity (Altomonte et al. 2013).

Results of the study revealed most internationalized industries - Machinery, Metallurgy and Optic and electric equipment production. Oil industry is also very active in international operations, however this particular sample consists of limited number of companies from this industry. Electric equipment production, Chemical and IT industries were defined as less international.

Regression model identified two factors significantly influence the dependent variable "Internationalization"– institutional factor "Lack of resources and the market imperfections", and industrial factor "International threat". Findings indicate positive influence of both industrial context and institutional factors. However, the amount of influential factors is rather small, which highlighted that there is a need to deeply explore particular company's activities in order to identify specific influential factors.

Industrial factor International threat reflects pressure from different stakeholders and includes competition pressure. Positive influence of this factor supports the idea that competitive hostility has positive impact on the internationalization proclivity of the Russian companies (Tsukanova, 2013). Also, it proves the hypothesis H6. "The higher dependency of company innovation from the pressure from foreign stakeholders (consumers, suppliers, competitors) can increase the probability of internationalization".

Positive influence of the institutional factor "Lack of resources and the market imperfections" reflects pull factor, which facilitate firm's aspiration to internationalize in order to gain resources, necessary for successful competing on domestic and international markets (Luo and Tung, 2007). As a consequence, it will positively influence company's proclivity to innovate due to new acquieredacquired knowledge. This findings support the hypothesis H4. "The higher dependency of company innovation process from lack of resources and market imperfection can increase the probability of internationalization". It also to some extent prove that importance of informal institutions in BRIC countries in contrast with inefficiency of formal governance institutions (Eunni and Manolova, 2012).

Analysis of the literature review demonstrated lack of information about situation with internationalization and innovation activities in Russian market. Thus, theoretical implications of the research lies in extention of the the data about Russian companies behavior on international market and their participation in R&D activities.

This research contributes to companies' knowledge assets due to lack of available information about situation with innovation and internationalization activities on Russian market. For companies, especially in Russia, with their specific industry situation and difficulties in institutional context, it is important to be aware about factors, which may significantly influence their competitive advantage.

Due to specific sample, this study has emphasis on influence of industrial context and institutional factors on internationalization proclivity of the innovative companies. Future research may provide more detailed observation of the impact of considered above factors on internationalization activities of non-innovative companies.

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Appendix

Correlations

		Factor_1	Factor_2	Factor_3	Factor_4	Factor_5	Factor_6	Factor_7	Factor_8	Factor_9	Factor_10	Factor_11	Factor_12
Factor_1	Pearson Correlation	1	,529**	,378**	,223**	,488**	,496**	-,057	-,075	-,010	,058	,369**	,379**
	Sig. (2-tailed)		,000	,000	,002	,000	,000	,431	,302	,893	,427	,000	,000
	N	194	188	185	191	181	182	190	191	191	191	174	179
Factor_2	Pearson	,529**	1	,345**	,348**	,452**	,483**	,088	-,098	-,036	,212**	,356**	,423**
	Sig. (2-tailed)	,000		,000	,000	,000	,000	,233	,181	,623	,004	,000	,000
	N	188	190	181	187	179	179	186	187	188	186	171	176
Factor_3	Pearson	,378**	,345**	1	,385**	,385**	,418**	,127	,032	,071	,243**	,487**	,455**
	Sig. (2-tailed)	,000	,000		,000	,000	,000	,080	,657	,326	,001	,000	,000
	N	185	181	195	195	180	182	190	192	192	191	176	181
Factor_4	Pearson	,223**	,348**	,385**	1	,243**	,233**	,019	,048	-,052	,139	,309**	,185*
	Sig. (2-tailed)	,002	,000	,000		,001	,001	,797	,505	,466	,052	,000	,012
	N	191	187	195	203	187	186	195	198	198	196	181	185
Factor_5	Pearson	,488**	,452**	,385**	,243**	1	,699**	-,160*	-,005	-,151*	,275**	,463**	,437**
	Sig. (2-tailed)	,000	,000	,000	,001		,000	,030	,946	,039	,000	,000	,000
	N	181	179	180	187	190	187	185	186	187	185	171	175
Factor_6	Pearson	,496**	,483**	,418**	,233**	,699**	1	-,049	-,076	-,064	,229**	,480**	,477**
	Sig. (2-tailed)	,000	,000	,000	,001	,000		,504	,301	,384	,002	,000	,000
	N	182	179	182	186	187	189	186	186	187	186	171	175
Factor_	Pearson	-,057	,088	,127	,019	-,160*	-,049	1	,089	,198**	,137	-,014	,140

7	Sig. (2-tailed)	,431	,233	,080	,797	,030	,504		,215	,005	,055	,853	,057
	N	190	186	190	195	185	186	198	197	197	196	178	184
Factor_	Pearson	-,075	-,098	,032	,048	-,005	-,076	,089	1	,340**	,152*	,156*	,114
8	Sig. (2-tailed)	,302	,181	,657	,505	,946	,301	,215		,000	,033	,037	,121
	N	191	187	192	198	186	186	197	201	200	197	179	185
Factor_	Pearson	-,010	-,036	,071	-,052	-,151*	-,064	,198**	,340**	1	,029	,072	,081
9	Sig. (2-tailed)	,893	,623	,326	,466	,039	,384	,005	,000		,686	,340	,270
	N	191	188	192	198	187	187	197	200	201	197	179	185
Factor_	Pearson	,058	,212**	,243**	,139	,275**	,229**	,137	,152*	,029	1	,110	,262**
10	Sig. (2-tailed)	,427	,004	,001	,052	,000	,002	,055	,033	,686		,144	,000
	N	191	186	191	196	185	186	196	197	197	199	179	185
Factor_	Pearson	,369**	,356**	,487**	,309**	,463**	,480**	-,014	,156*	,072	,110	1	,687**
11	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,853	,037	,340	,144		,000
	N	174	171	176	181	171	171	178	179	179	179	183	178
Factor_	Pearson	,379**	,423**	,455**	,185*	,437**	,477**	,140	,114	,081	,262**	,687**	1
12	Sig. (2-tailed)	,000	,000	,000	,012	,000	,000	,057	,121	,270	,000	,000	
	N	179	176	181	185	175	175	184	185	185	185	178	188

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).