DETERMINANTS OF FAST-GROWING SMES' CONCENTRATION IN THE RUSSIAN REGIONS

Stepan ZEMTSOV,
Senior researcher, PhD, Russian Academy for National Economy and Public Administration, spzemtsov@gmail.com[1]
Vera BARINOVA,
Head of the laboratory, PhD, Gaidar Institute for Economic Policy, barinova@iet.ru
Alla SOROKINA,
Senior researcher, PhD, Gaidar Institute for Economic Policy, sorokina@ranepa.ru[2]

ABSTRACT. *Many small and medium enterprises (SMEs) grow fast and play an important role in regional development. Fast-growing companies may contribute to more than 50% GDP growth (Europe INNOVA Gazelles Innovation Panel, 2008).*

There is interdependence between innovative development of regions and emergence of fast growing SMEs ('gazelles'). Developed regional innovation systems create a fertile environment for increasing the number of fast-growing companies. We assume that regional innovation performance (as a share of R&D personnel in employment, share R&D expenditures in gross regional product, etc.) may be a significant factor for gazelles' concentration. There were no papers on Russian regional data before that could prove it.

The main objects of the article are factors, which can determine the proportion of fast-growing manufacturing SMEs during post-crisis period (2009-2012) in the Russian regions.

An econometric analysis demonstrates a strong correlation between the share of fast-growing manufacturing SMEs and indicators of regional innovation performance. Market potential also plays an important role. Results could be used as a policy advice in Russia.

KEYWORDS: gazelles, Russian regions, human capital, market potential, firms, regional innovation system.

JEL: L6, L25, L26, M13, O10

Determinants of fast-growing SMEs' concentration in the Russian regions: role of regional innovation systems

[1] http://www.ranepa.ru/eng/
[2] http://www.iep.ru/en

INTRODUCTION: WHAT ARE SMES AND WHAT "GAZELLES" HAVE TO DO WITH THEM

Firstly, it is necessary to distinguish different groups of SMEs, because their role in the innovative economy differs greatly depending on their size, scale, specialization and geographical position.

The criteria for the companies to be considered SMEs vary from country to country, but usually imply the number of employees and either turnover or balance sheet total. In some countries the definition of SMEs also depends on the industry, for example, in the USA[3], the SME standards are closely connected with the North American Industry Classification System (NAICS)[4]. That is, in the sphere of Agriculture, Forestry, Fishing and Hunting a small company, producing corn, may have a turnover not more than 0.75 million dollars a year, while for the mushrooms and berries' picking a company may have a turnover of 11 million dollars and is still considered a small one.

The European Union sets the following restrictions for the company to be a small enterprise: a number of employees from 10 to 50, a years' turnover – from 2 to 10 million euro. For medium enterprises the maximum for turnover is 43-50 million euro and for employees – it's 250 people.

In Russia we used to have different criterions[5], they were the following: from 1 to 15 people – a microfirm, from 16 to 100 – a small firm, from 101 to 250 – a medium firm. The turnover was to be up to 60 million roubles for a microfirm, up to 400 million roubles for the small firms and not more than 1000 million roubles for medium firms[6].

The difference between criterions used unabled many companies to get the desired governmental support and tax benefits in Russia, that is why they were revised. In January 2015 the criteria were announced to be updated[7], from that moment the maximum turnover for micros increased to 120 million roubles, for small firms – to 800 million roubles, for medium firms – to 2 billion roubles.

[3] Small business size regulations: https://www.sba.gov/content/small-business-size-standards

[4] The North American Industry Classification Manual-United States: http://www.ntis.gov/products/naics.aspx

[5]Federal law on the development of small and medium business in Russia (Russian: Федеральный закон о развитии малого и среднего предпринимательства в Российской Федерации)

[6] Resolution of the Government of the Russian Federation on February 9, 2013 N 101 the limit values of revenue from sale of goods (works, services) for each category of small and medium-sized enterprises (Russian: Постановление Правительства Российской Федерации от 9 февраля 2013 г. N 101 о предельных значениях выручки от реализации товаров (работ, услуг) для каждой категории субъектов малого и среднего предпринимательства)

[7] Order of the Government of the Russian Federation on January 27, 2015 N 98-p Moscow about anticrisis plan for sustainable development and social stability(Russian: Распоряжение Правительства Российской Федерации от 27 января 2015 г. N 98-р г. Москва))

During the crisis SMEs experience lots of difficulties, and the economy as a whole as well. The most important role of innovative driver is played be the fast-growing manufacturing SMEs. Their revenues may make more than 50% of the GDP growth in developed countries (Europe INNOVA Gazelles Innovation Panel, 2008), and up to 80% of the total number of new workplaces, even though only 5% of the companies may be considered "gazelles".

A fast-growing company, according to Birch (Birch, 1987), is a company with income from 2 to 30 million dollars, which has been having a 20% growth rate during the latest 3 years before the analysis.

We analysed the fast-growing companies with the data on the latest 5 years of the post-crisis period in Russia (2009-2012). For Russia, it was also important, that a company should have a stable growth rate every year. The dataset was collected from SPARK (Professional market and company analysis system), and consisted of information about income, owners, location, industry and several financial indicators.

The unique features of the gazelles are explained by their innovative activities, new products' launches and a number of exogenous and endogenous factors. These companies turned out to be very resistant to turbulent economies, thanks to the innovative policies they carry on, that imply permanent production modernization, cost reduction and new products' launch. This makes them highly competitive comparing to other SMEs in a certain region.

WHAT GAZELLES LIVE IN RUSSIA: THEIR ALLOCATION AND SPECIALIZATION

The Russian gazelles are operating in 33 of the 85 regions of Russia. 30% of them belong to Moscow and St. Petersburg, specializing in ICT (16%), professional equipment (15%), biotechnologies (9%) and other high-tech industries.

The majority of companies are manufacturing (more than 3000 firms), which is about 20% of total number of Russian SMEs. Many of the gazelles operate in construction (more than 3000 firms) and provide real estate operations (more than 2000 firms).

In the sectors of wholesale and retail trade; repair of motor vehicles, motorcycles, household goods and personal items - about 30% of the organizations were characterized by an average annual real growth in revenue of at least 20% over the period from 2010 to 2012 (13% of all Russian gazelles). This situation is not unique to Russia. In many countries, the trade sector has an important economic and social role. The share of trade in the world's GDP is about 10%, and total employment - 13%[8]. But the proportion of the gazelles in Russia is much higher than in

[8] Eurostat, US Census (citation from the strategy of trade development in Russia in 2011 – 2015 (Russian: Стратегии развития торговли в Российской Федерации на 2011 - 2015 годы и период до 2020 года.

any developed country, where only 5-10% of SMEs are fast-growing (Delmar, Davidsson, Gartner, 2003; Europe INNOVA Gazelles Innovation Panel, 2008).

Table 1. The number of "gazelle-companies" in different industries in Russia in 2013

№	*Industry*	*The number of gazelle-companies*	*Share of gazelles among other companies of this industry (%)*
1	Manufacturing	3181	20
2	Construction	3175	26
3	Real estate operations, hiring and renting, services' delivery	2066	16
4	Wholesale and retail trade, vehicles and motorcycles repair	1716	29
5	Transport and communications	1203	19
6	Agriculture, hunting and gathering	733	17
7	Finance	358	23
8	Other activities	338	14
9	Production and distribution of electricity, water, gas	293	13
10	Mining	222	20
11	Hotels and restaurants (on trade)	175	14
12	Fishery	29	13
	TOTAL	*13 489*	*20*

In Russia the majority of fast-growing companies are engaged in wholesale trade of petroleum, oil and lubricants (332 companies which is 19% of total SMEs), wholesale and retail trade, vehicles and motorcycles repair (16% of the total) and in wholesale trade of tobacco products (9% of the total).

In the manufacturing industry (24% of gazelles), the largest number of high-growth companies are engaged in the production of concrete, plaster and cement (223 companies), the production of general-purpose machinery (202 companies), manufacturing of plastic products (198 companies) and production of metal structures and products (173 companies). This can be explained by a huge growth of the construction industry in 2010-2012, where, according to Rosstat, the average annual real growth rate of construction for the period was 5%, which is higher than GDP growth rate.

утверждена приказом Министерства промышленности и торговли Российской Федерации от 31 марта 2011 г. № 422).

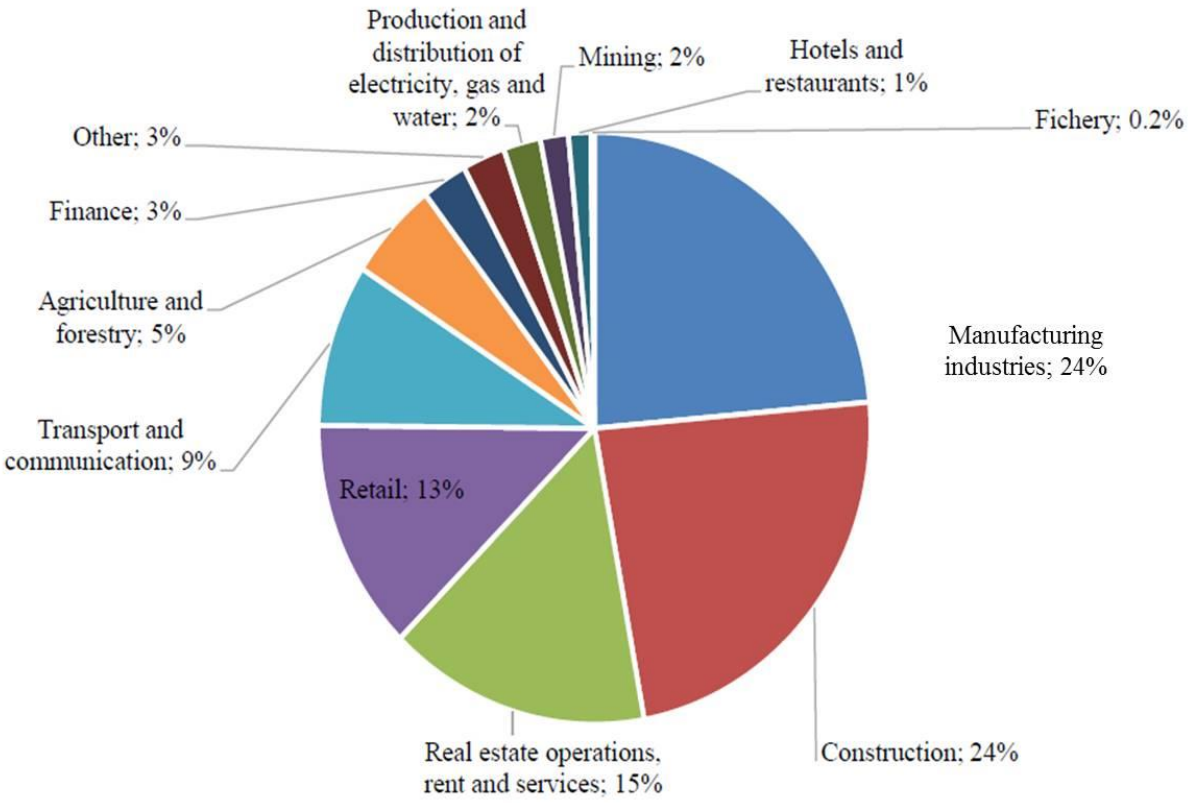

Figure 1. The structure of Russian companies-"gazelles" in 2013

The gazelles distribution in Russia is very uneven. The decile coefficient of differentiation ranges from 109 (manufacturing) to 1095 (trade sector). Most Russian "gazelles" are concentrated in Moscow, the Moscow region and St. Petersburg. These three regions have 30% of all Russian manufacturing gazelles, 45% gazelles of the construction industry, 60% of the fast-growing companies specializing in real estate transactions, 50% of gazelles of trade and 34% of fast-growing SMEs in transport and communication.

Fast-growing companies of manufacturing and construction industries are distributed more evenly (the decile coefficient is 109 and 133 respectively). The degree of differentiation among gazelles is average in the following areas: transport and communications (decile coefficient is 306), agriculture (decile coefficient equal to 280) and real estate operations (decile coefficient equal to 469).

The highest concentration of fast-growing companies in the Russian regions is observed in the following areas: trade and repairs (decile coefficient greater than 1000-fold), financial services, mining, hotel and restaurant business and fishing.

The identified patterns of geographic location and sectoral distribution of fast-growing small and medium-sized enterprises remain sufficiently stable for the latest several years in Russia, but due to the crisis the tendencies are supposed to change.

As the economic growth rate in Russia slowed down significantly, the estimated rate of decline of Russia's GDP in 2015 is 3.8%, the gazelles may be considered one of the main drivers of economic development. To find out the main trends, it is important to distinguish factors that affect concentration of gazelles in regions.

WHAT FACTORS AFFECT GAZELLES' CONCENTRATION IN RUSSIAN REGIONS

The development of fast-growing companies is affected not only by internal factors of competitiveness, but also by external, or environmental, factors that may affect their in-house development potential (Mason, Bishop, Robinson, 2009). We analyse the influence of various parameters of regional environment (regional innovation system) on the distribution of high-growth companies in Russian regions.

As mentioned above, the number of gazelles is unevenly distributed across the regions of Russia. The presence of fast-growing companies may be bound to the access to key resources - financial, intellectual and so on, as well as the general characteristics of the institutional environment. All these parameters in terms of fast-growing small and medium businesses in Russia can be reflected in the index of innovative development of regions. In this study we used the results of innovative regions rating, developed by the Association of Innovative Regions of Russia (AIRR) (Rating…, 2013)[9], that is used by the Ministry of Economic Development of Russia for mapping the distribution of innovative potential of the country.

The pattern of distribution of the data in Figure 2 indicates the existence of a positive relationship between the number of gazelles and the level of innovative development of the region (the AIRR index). A good approximation has an exponential function (the value of the reliability of this model is 62%):

$$y_i = 1{,}3e^{10x_i} \quad (1),$$

where y is the number of gazelles in the region i, and x is index of innovative development of the region i.

[9] http://www.i-regions.org/#eng

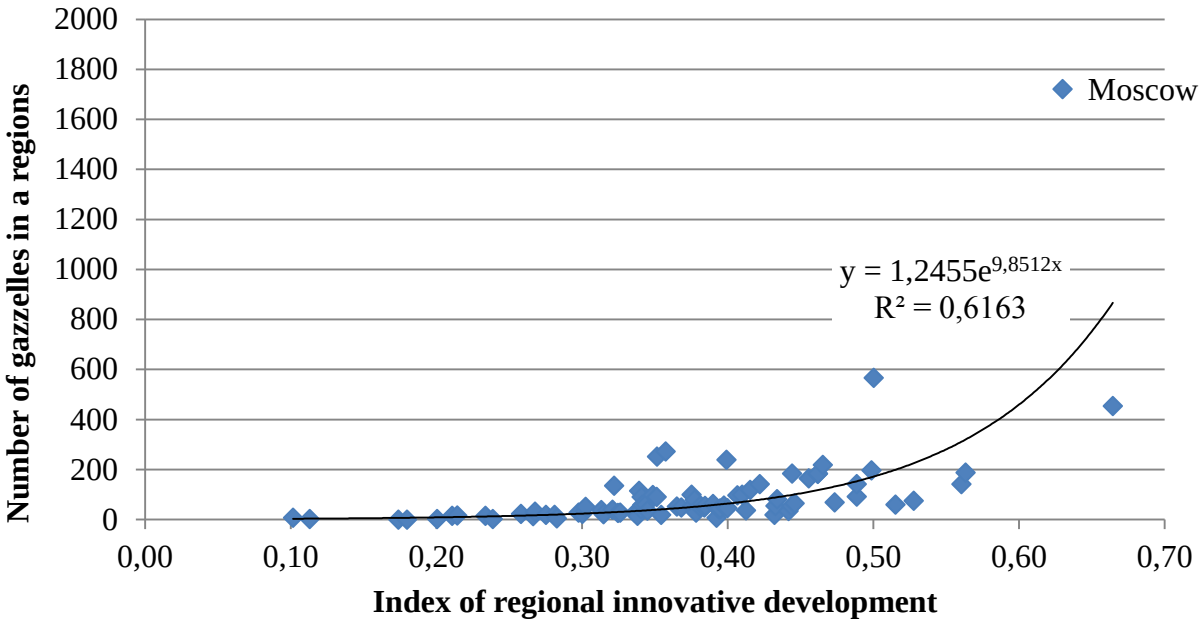

Figure 2. Relationship between innovative development (Rating…, 2013) and the number of gazelles in the Russian regions

Since x is in the range from zero to one, the average level of innovative development (index value of 0.37) will correspond to the number of gazelles approximately equal to 52.7. An example of this level is the Kirov region (index of innovative development is 0.37), in which the authors have identified 49 gazelles. Thus, the constructed model has a good predictive power, but there are still some outliers.

There is a close correlation between the number of gazelles in the region and sub-indexes of the AIRR index (Table 2).

The closest relationship exists between the number of gazelles" and regional performance, reflecting the development of R&D (the correlation coefficient is 0.54):

- the number of researchers per capita (the correlation coefficient is 0.59);
- the number of PCT- applications per economically active population (the correlation coefficient is 0.56);
- the proportion of employees with higher education in the total working age population (correlation coefficient is 0.55);
- the number of national patent applications per economically active population (the correlation coefficient is 0.52).

Table 2. The correlation coefficients between the indicators of the index of innovative development (the AIRR index) of the Russian regions in 2013 and the number of gazelles in the regions

№	Indicators	Correlation coefficient
	I. RESEARCH AND DEVELOPMENT	0.54
I-1	The number of university students per capita	0.45
I-2	The number of researchers per capita	0.59
I-3	The share of employees with higher education in the total population of working age,%	0.55
I-4	The number of international PCT- applications per economically active population	0.56
I-5	The number of national patent applications per economically active population	0.52
I-6	The number of articles published in the Web of Science per number of researchers	0.03
I-7	The number of articles published in peer-reviewed journals indexed in the Russian index of citation per number of researchers	-0.21
I-8	Gross domestic expenditure on research and development as a percentage of GRP, %	0.39
I-9	The proportion of the organizations of the business sector in total domestic expenditure on research and development, %	0.14
	II. INNOVATION	0.43
II-1	Share of organizations implementing technological innovations in the total number of organizations, %	0.17
II-2	Share of organizations that carried out the non-technological innovation in the total number of organizations, %	0.21
II-3	The share of small businesses, implementing technological innovation in the total number of small enterprises, %	0.16
II-4	The share of innovative goods, works and services in the total volume of goods shipped, works and services, %	0.24
II-5	The share of newly introduced or affected by significant technological changes innovative goods, works and services new to the market, in the total amount of shipped goods, works, services, %	0.32
II-6	The number of used inventions per capita	0.35
II-7	The volume of revenues from the export of technology in relation to GRP	0.33
II-8	Number of advanced production technologies per economically active population	0.26
II-9	The intensity of expenditure on technological innovation, %	0.31
	III. SOCIO-ECONOMIC CHARACTERISTICS OF INNOVATION ACTIVITIES	0.30
III-1	The regional and local budget share of total costs for technological innovations,%	0.06
III-2	GRP per employed in the economy in the region (excluding extractive industries), rub.	0.44
III-3	The share of employment in high-tech and medium-tech industries, %	0.09
III-4	The share of high-tech and medium-tech products in the total volume of shipped goods, works, services (excluding manufacturing related to mining), %	0.04
III-5	Share of organizations that use the Internet in the total number of surveyed organizations, %	0.24
	INDEX OF INNOVATION DEVELOPMENT OF RUSSIA'S REGIONS FOR MONITORING AND CONTROL	0.52

The figures characterize the magnitude and quality of human capital in the region. Thus, the share of researchers and the share of employed with higher education reflects the high value of the labour force in the region. The number of international and national patent applications reflect the impact of the researchers' activities, and thus the quality of their work effort. We can formulate a hypothesis about the importance of having high-quality human resources in the region for the formation of companies-growing gazelles. We will try to test this hypothesis by analysing the factors of manufacturing gazelle concentration in Russian regions.

Manufacturing companies were selected for analysis because their concentration is associated not only with the traditional factors (natural resources, capital, labour), but also with the effect of innovation factors, localization and agglomeration effects. It was important to understand whether such factors influence the concentration of fast-growing companies, and whether they can be more important than traditional ones.

The database was collected from SPARK (Professional market and company analysis system), and consists of information about income, owners, location, industry and several financial indicators. Unfortunately, the database does not contain information of R&D, but we extract some data from Russian patent office about number of patents per each firm. Regional factors, according to Russian Federal State Statistical service, include research and development indicators (such as R&D expenditures, R&D employees, etc.), urbanization rate, human capital, investment climate, etc. There were also rates of industrial growth as an indicator of marketing growth. There are 419 manufacturing fast-growing SMEs from 9220 companies in database, which is approximately 5%.

We chose two options for calculating the dependent variable:

- Share of manufacturing (processing) firms with 20% real (inflation-adjusted) increase in revenues (geometric mean growth) over the last three years in a region among all manufacturing gazelles in Russia (*Gazelle_1*).
- Share of manufacturing (processing) firms with 20% real (inflation-adjusted) increase in revenues (geometric mean growth) over the last five years in a region among all manufacturing gazelles in Russia (*Gazelle_2*) (figure 3).

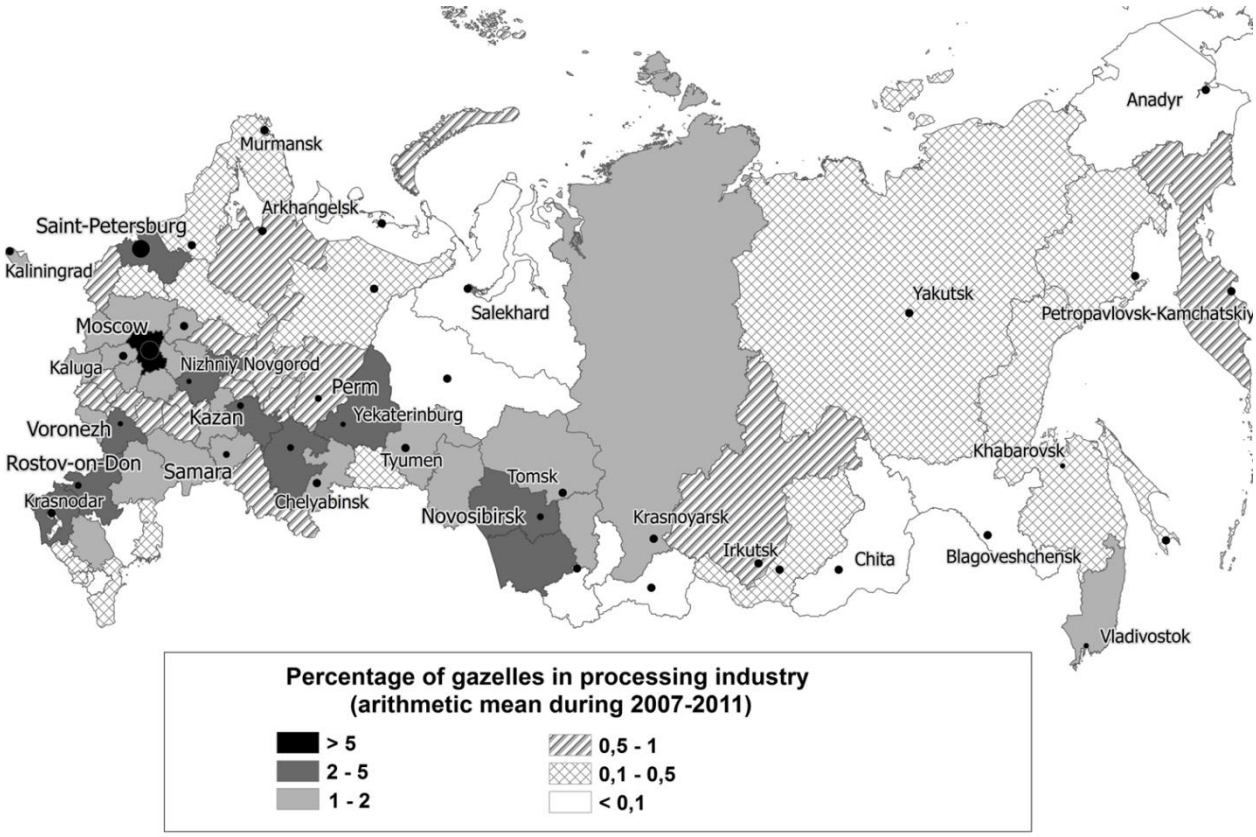

Figure 3. Regional concentration of gazelles in manufacturing industry (the share of manufacturing gazelles in a region from all manufacturing gazelles in Russia)

In this work, we rely on an empirical model from the article "Determinants of high-growth firms: why do some countries have more high-growth firms than others?" (Teruel, De Wit, 2011), although generally accepted model that determines the concentration of gazelles in the economy of a region does not exist

$$\ln(Gazelle_i) = \beta_0 + \beta_0 \times \ln(\sum X_i) + \varepsilon \quad (2),$$

$$X_i = HC + Economics + Geography + Innovation + Agglomeration + Localization \quad (3),$$

where i – is a Russian region; *Xi* - is a set of variables that characterize human capital (*HC*), dynamic and structural characteristics of the economy (*Economics*), the institutional environment of the region (*Institutions*), economic and geographic characteristics (*Geography*), innovative activity (*Innovation*), agglomeration (*Agglomeration*) and localization effects (*Localization*).

We suggest several hypotheses:

- The higher human potential concentrated in the region is, the higher is the regional share of manufacturing gazelles, because fast-growing manufacturing SMEs need highly-qualified personnel for new products creation, marketing, etc.

- The higher regional economic growth is, the higher is t the regional share of manufacturing gazelles, whose growth is based on the expanding domestic market.
- The better the institutional environment in the region is, the higher is the regional share of manufacturing gazelles, using the best conditions for doing business.
- Favourable economic and geographical position (EGP)[10] increases the regional share of manufacturing gazelles, which are concentrated in the regions located near the large and growing markets or near the main trade flows.
- The higher innovation activity in the region is, the higher is the regional share of manufacturing gazelles: fast-growing manufacturing SMEs use the results of innovative activities of other economic agents to release new products and maintain growth.

All variables (table 3) eventually were log transformed.

Table 3. Independent variables

			G1[11]	G2
HC	HDI	Human development index	1	1
	Dependance_ratio	The share of people of older and younger ages	1	1
	High_Edu	The share of employees with higher education	1	
	Educ_years	The number of years of education	1	1
Economics	GRP_per_cap	GDP per capita		
	GRP_potential	Market potential	1	1
	Industry_growth_index	Industrial production index		
	Ivest_per_cap	Investments in fixed capital per capita		
	Foreign_ivest_per_cap	FDI per capita		1
	Import_per_GRP	Import per GRP	1	1
	Export	Export	1	1
	Agriculture_empl	The proportion of people employed in agriculture	1	1
	Trade_empl	The share of employment in trade	1	1
Geography	EGP	Economic-geographical position[12]	1	1
	Distance_to_Moscow	Distance from Moscow	1	1
	Distance_to_agglomeration	Distance to the agglomeration (1	1	1

[10] The term (Baranskiy, 1946) used to explain the differences between the localities associated with the proximity to major markets, trade flows, etc.(mostly used in Russian geographical literature)

11G1=1, if correlation coefficient between the indicator and dependent variable *Gazelle_1* > 0,3

[12] *EGP* is an arithmetic average of binary ranks (0 or 1) of seven variables: capital status, agglomeration (more than 1 million inhabitants), seaside location (but non-freezing sea), the neighborhood with the Moscow region, proximity to agglomeration (over 1 million inhabitants), the cross-border provision and comfort of living, market and natural resource potential

		million people)		
	Population_density	Population density	1	
	Settlement_density	The density of cities		
Innovation	PCT_appl	PCT-patent applications	1	
	RnD_expend_per_cap	R&D expenditure per capita	1	1
	RnD_empl	Employed in R & D per capita	1	1
	Development_per_cap	Expenditure on development activities per capita	1	1
	Innov_firms	The number of innovative companies according to the portal "Innovation 9000»: http://9000innovations.ru/kompanii/po-regionu	1	1
Agglomeration	Big_city	The proportion of residents of large cities (over 250 thousand people.)		1
	Small_city	The proportion of people living in small towns (less than 100 thousand people.)	1	
	Urbanization	The proportion of urban population	1	
	Diversification_industry	Diversification of the industry (concentration index Herfindahl-Hirschman on shares GRP)		
	Diversification_empl	Diversification of employment (Shannon entropy index)		
Localization	Process_ind	The share of manufacturing industries	1	1
	Mashinery	The share of vehicle production in the manufacturing industry		
	Transport_cars	The share of machinery and equipment in manufacturing		

Market potential is calculated by using the modified gravity model (Steward, 1947; Baburin, Zemtsov, 2013)

$$GRP_potential_j = GRP_j + \sum GRP_i / Distance_{ji}, \quad (4),$$

where *GRPj* is the value of GRP (calculated by the index of physical volume, taking into account inter-regional price index) in the region j, the potential for which is determined; *GRPi* is the value of GRP in the i-th region of Russia; $Distance_{ji}$ is a distance from the regional centre of region j to the regional centre of the region i by road in kilometres. The indicator shows not only the volume of the market in the region, but the potential volume of the market around the region, diminishing with the distance from the regional centre.

Applications for the foreign patent registration in offices within the Patent Cooperation Treaty (PCT-application) represent the most of the Russian commercialized patent applications.

Many of the indicators, related to the dependent variables, are mutually correlated due to the small sample size (74 regions with manufacturing gazelles).

The authors have compiled a matrix of mutual correlations (Table 4).

Table 4. Matrix of mutual correlations

	Gazelle_1	Development_per_cap	GRP_potential_2011	EGP	RnD_empl	RnD_expend_per_cap	Export	Trade_empl	Population_density	Process_ind_2011_2009	HDI	Educ_years	PCT_appl*100	Import_per_GRP	Urbanization	High_Edu	Small_city	Agriculture_empl	Distance_to_Moscow	Dependance_ratio	Distance_to_agglomeration
Gazelle_1	1,00	0,71	0,70	0,65	0,61	0,60	0,60	0,56	0,52	0,50	0,49	0,49	0,41	0,40	0,36	0,29	-0,28	-0,37	-0,47	-0,66	-0,66
Development_per_cap	0,71	1,00	0,66	0,49	0,80	0,82	0,61	0,32	0,24	0,45	0,57	0,36	0,33	0,32	0,44	0,15	-0,13	-0,45	-0,40	-0,60	-0,49
GRP_potential	0,70	0,66	1,00	0,47	0,58	0,62	0,76	0,33	0,21	0,18	0,70	0,44	0,41	0,30	0,37	0,31	-0,23	-0,60	-0,22	-0,35	-0,45
EGP	0,65	0,49	0,47	1,00	0,37	0,34	0,34	0,50	0,60	0,44	0,31	0,28	0,20	0,33	0,27	0,12	-0,23	-0,24	-0,49	-0,56	-0,62
RnD_empl	0,61	0,80	0,58	0,37	1,00	0,96	0,42	0,31	0,16	0,21	0,45	0,57	0,30	0,34	0,43	0,45	-0,24	-0,51	-0,23	-0,42	-0,38
RnD_expend_per_cap	0,60	0,82	0,62	0,34	0,96	1,00	0,51	0,24	0,08	0,23	0,52	0,58	0,24	0,32	0,48	0,44	-0,18	-0,56	-0,18	-0,42	-0,36
Export	0,60	0,61	0,76	0,34	0,42	0,51	1,00	0,33	0,00	0,46	0,78	0,34	0,29	0,40	0,47	0,08	-0,12	-0,55	-0,10	-0,49	-0,36
Trade_empl	0,56	0,32	0,33	0,50	0,31	0,24	0,33	1,00	0,41	0,43	0,20	0,34	0,37	0,40	0,24	0,14	-0,21	-0,34	-0,37	-0,60	-0,49
Population_density	0,52	0,24	0,21	0,60	0,16	0,08	0,00	0,41	1,00	0,33	0,08	0,27	0,20	0,28	0,00	0,27	-0,34	-0,03	-0,64	-0,37	-0,51
Process_ind	0,50	0,45	0,18	0,44	0,21	0,23	0,46	0,43	0,33	1,00	0,23	0,09	0,05	0,38	0,45	-0,21	0,00	-0,15	-0,48	-0,72	-0,53
HDI	0,49	0,57	0,70	0,31	0,45	0,52	0,78	0,20	0,08	0,23	1,00	0,48	0,41	0,23	0,33	0,33	-0,41	-0,55	-0,11	-0,34	-0,26
Educ_years	0,49	0,36	0,44	0,28	0,57	0,58	0,34	0,09	0,27	0,09	0,48	1,00	0,31	0,35	0,28	0,87	-0,50	-0,60	-0,22	-0,34	-0,25
PCT_appl*100	0,41	0,33	0,41	0,20	0,30	0,24	0,29	0,37	0,26	0,05	0,41	0,31	1,00	0,26	0,17	0,29	-0,28	-0,24	-0,14	-0,26	-0,30
Import_per_GRP	0,40	0,32	0,30	0,33	0,34	0,32	0,40	0,40	0,28	0,38	0,23	0,35	0,26	1,00	0,36	0,19	-0,01	-0,34	-0,33	-0,57	-0,28

Urbanization	0,36	0,44	0,37	0,27	0,43	0,48	0,47	0,24	0,00	0,45	0,33	0,28	0,17	0,36	1,00	0,05	0,05	-0,37	-0,24	-0,56	-0,20
High_Edu	0,29	0,15	0,31	0,12	0,45	0,44	0,08	0,14	0,27	-0,21	0,33	0,87	0,29	0,19	0,05	1,00	-0,53	-0,42	0,01	-0,02	-0,12
Small_city	-0,28	-0,13	-0,23	-0,23	-0,24	-0,18	-0,12	-0,21	-0,34	0,00	-0,41	-0,50	-0,28	-0,01	0,05	-0,53	1,00	0,33	0,04	0,05	0,25
Agriculture_empl	-0,37	-0,45	-0,60	-0,24	-0,51	-0,56	-0,55	-0,34	-0,03	-0,15	-0,55	-0,60	-0,24	-0,34	-0,37	-0,42	0,33	1,00	0,18	0,31	0,22
Distance_to_Moscow	-0,47	-0,40	-0,22	-0,49	-0,23	-0,18	-0,10	-0,37	-0,64	-0,48	-0,11	-0,22	-0,14	-0,33	-0,24	0,01	0,04	0,18	1,00	0,59	0,39
Dependance_ratio	-0,66	-0,60	-0,35	-0,56	-0,42	-0,42	-0,49	-0,60	-0,37	-0,72	-0,34	-0,34	-0,26	-0,57	-0,56	-0,02	0,05	0,31	0,59	1,00	0,51
Distance_to_agglomeration	-0,66	-0,49	-0,45	-0,62	-0,38	-0,36	-0,36	-0,49	-0,51	-0,53	-0,26	-0,25	-0,30	-0,28	-0,20	-0,12	0,25	0,22	0,39	0,51	1,00

Based on the results, Fig. 4 shows the relationship between the main selected indicators.

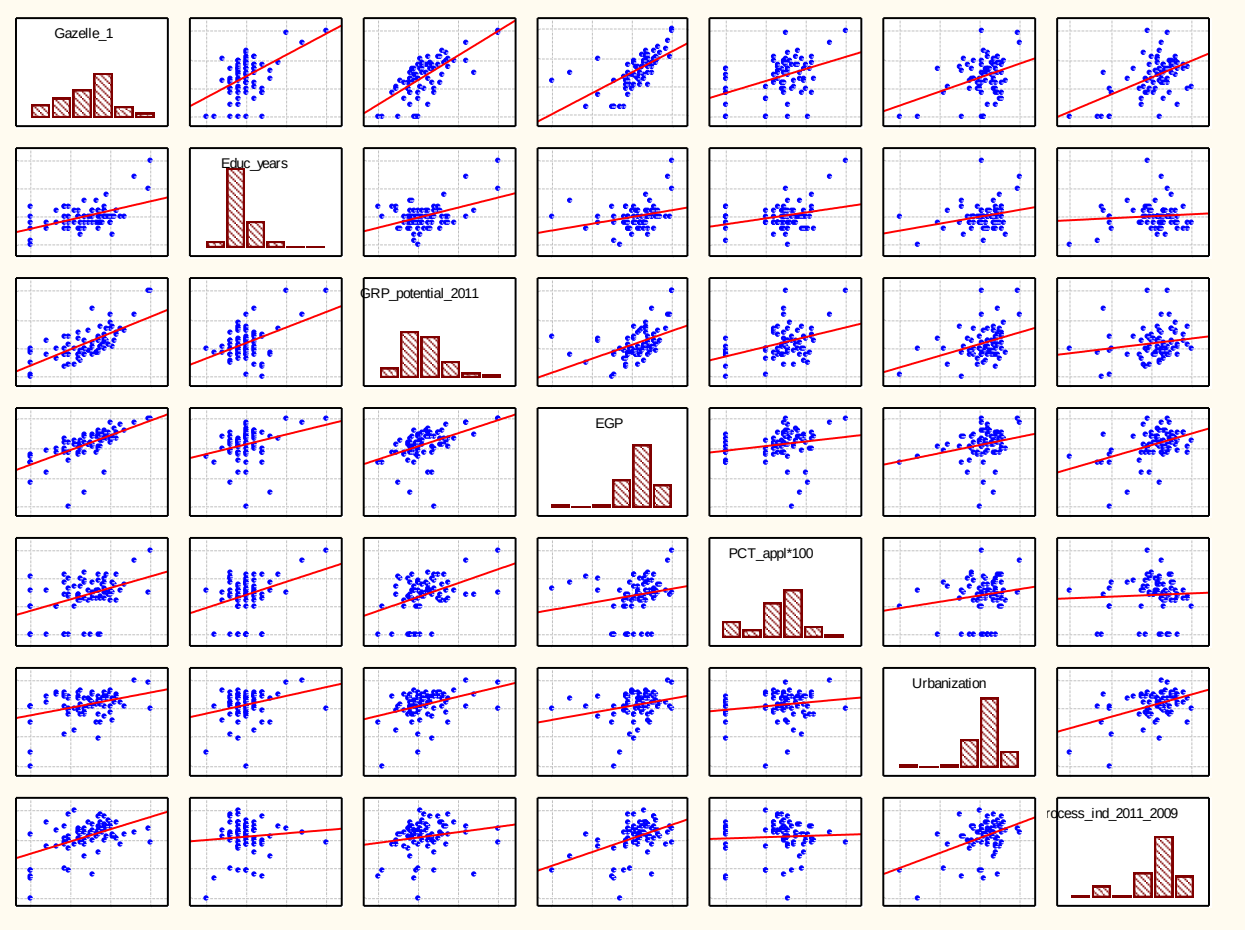

Figure 4. The relationship between the main selected indicators

Table 5 shows the main results of the model calculations.

Table 5. Model results

OLS. 74 regions. Dependent variable: *Gazelle_1*		
	Model 1.1	**Model 1.2**
const	-23,64***	2,4
GRP_potential	0,46***	
EGP	0,58**	0,89***
Process_ind	0,53***	0,4***
Educ_years	9,04***	
PCT_appl	0,06*	
Urbanization	-0,45	-0,3
RnD_empl		0,45***
Import_per_GRP		0,05
R2	0,74	0,64
Adjusted R2	0,72	0,61

Significance (p-value): *** - 0.005; ** - 0.05; * - 0.1

The main results of the model 1.1:

- Fast-growing manufacturing firms operate in regions with significant market potential or near them (*GRP_potential*) (Fig. 5). Major markets serve as a reliable source of growth in the post-crisis period. In regions with 1% larger market potential, the regional share of manufacturing gazelles is 0.46% higher
- Economic-geographical position (*EGP*) (Fig. 6) of a region is an important factor. It is useful for the companies to locate near the largest metropolitan area, in seaside region or in a border region, which can be explained by foreign trade activity of gazelles
- Human potential of the region (average years of schooling - *Educ_years*), despite the decline in the education quality in Russia, still has an impact on the growth of manufacturing firms. A strategy of rapid growth at a significant period of time is almost impossible without technical training and relevant knowledge

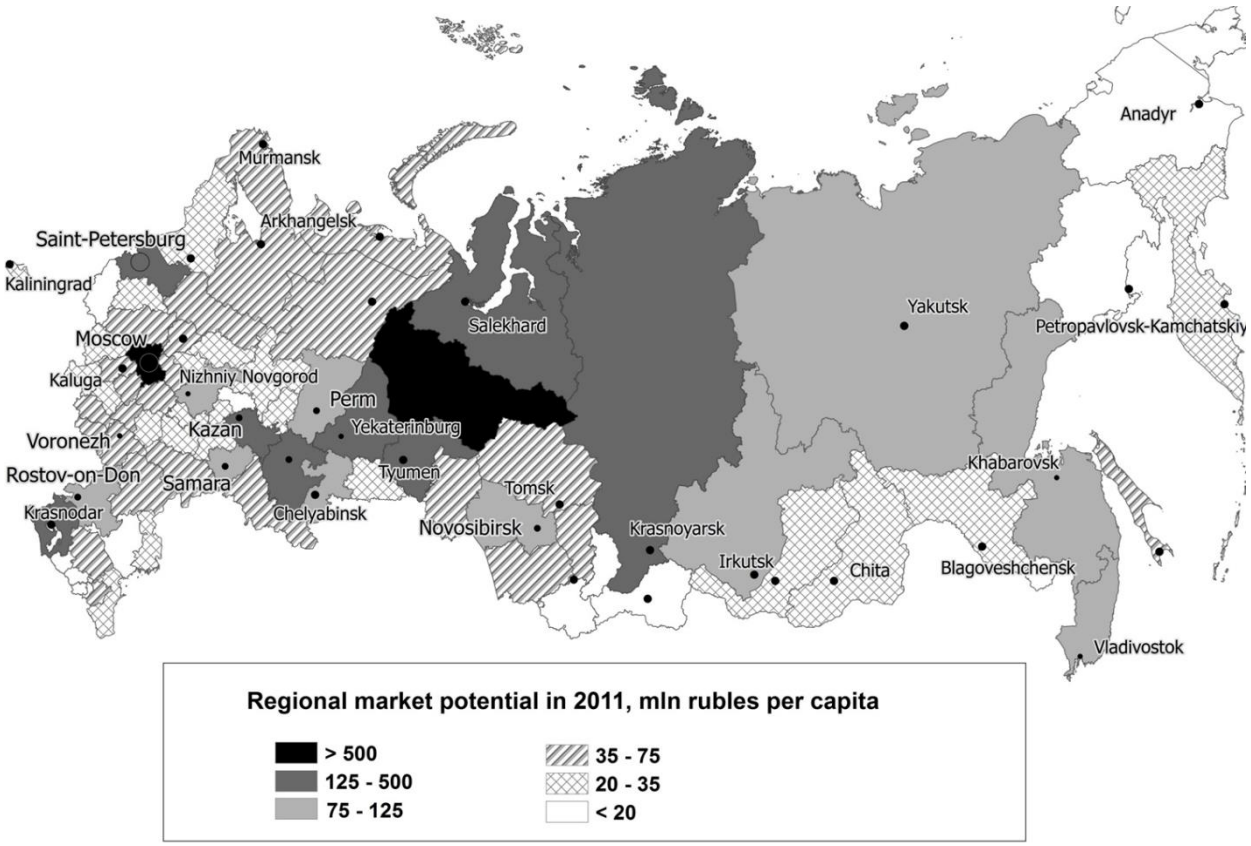

Figure 5. Regional market potential

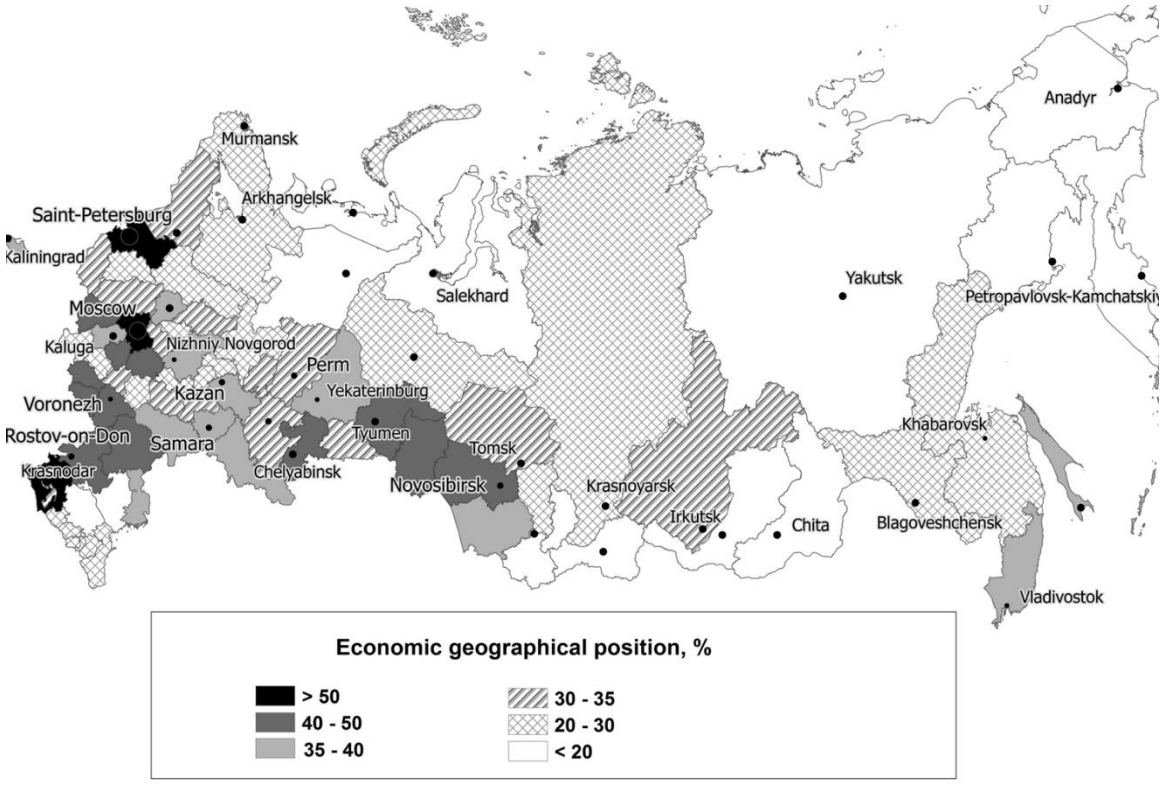

Figure 6. Economic geographical position

The results of the model 1.2:

- Fast-growing SMEs may take an advantage of the high innovation potential of a region. The regional share of manufacturing gazelles was above 0.45% higher (*excluding GRP_potential*) in a region, where the proportion of people employed in R & D (*RnD_empl*) (Fig. 7) was more on 1%, This dependence is much lower for PCT-applications per capita (*PCT_appl*) (Fig. 8): the regional share of manufacturing gazelles was 0.04% higher.
- Localization effects (*Process_ind* - the share of employment in manufacturing (Fig. 9)) prevail over agglomeration effects (*Urbanization* - the proportion of urban population) in Russia. Manufacturing gazelles prefer to localize in the regions with a high share of manufacturing in GRP than in the highly urbanized regions

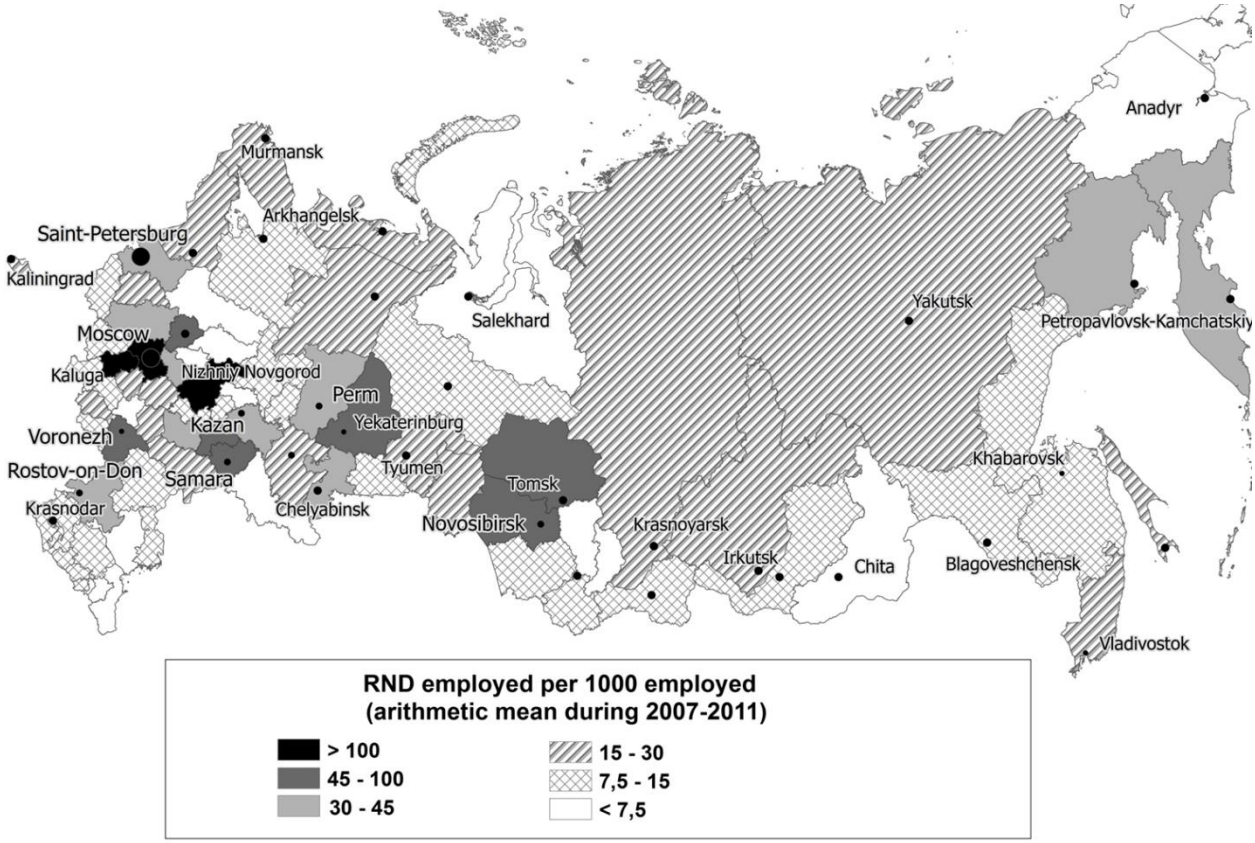

Figure 7. R&D employment per 1000 empoyed

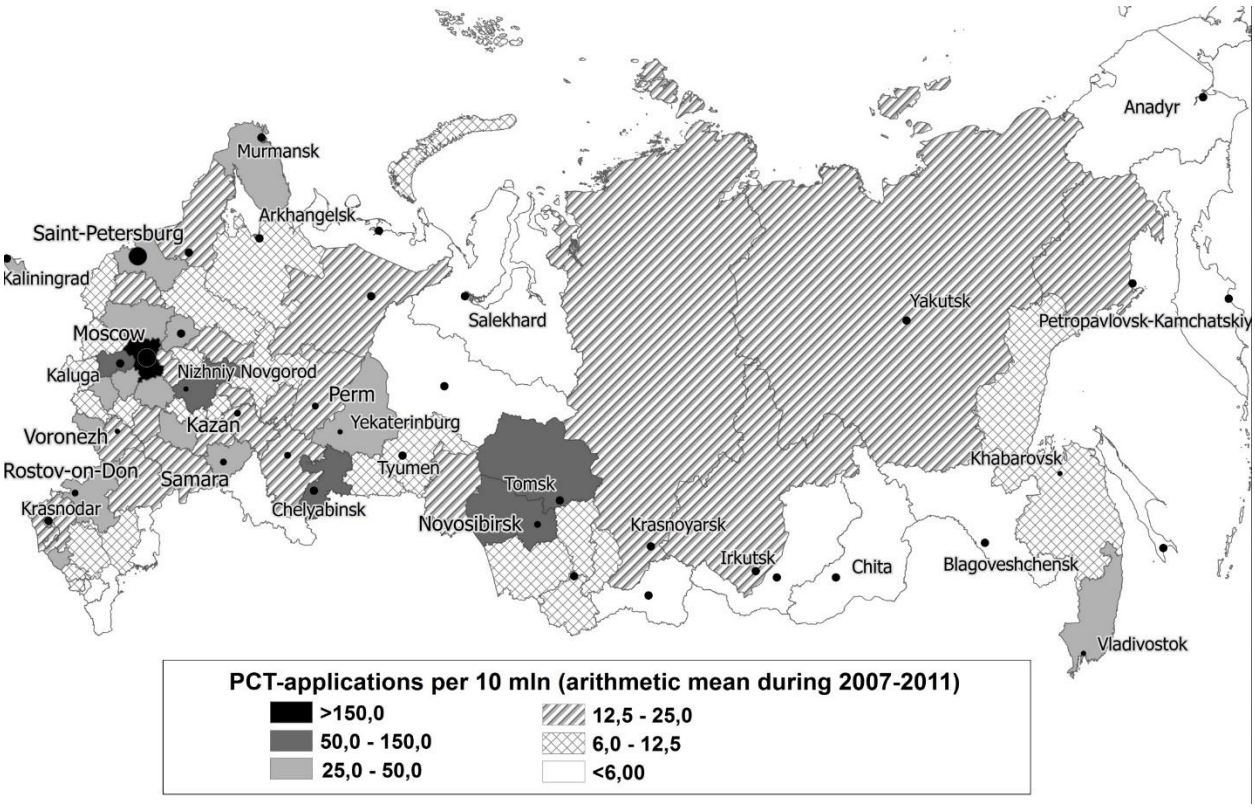

Figure 8. PCT-applications per 10 mln inhabitants

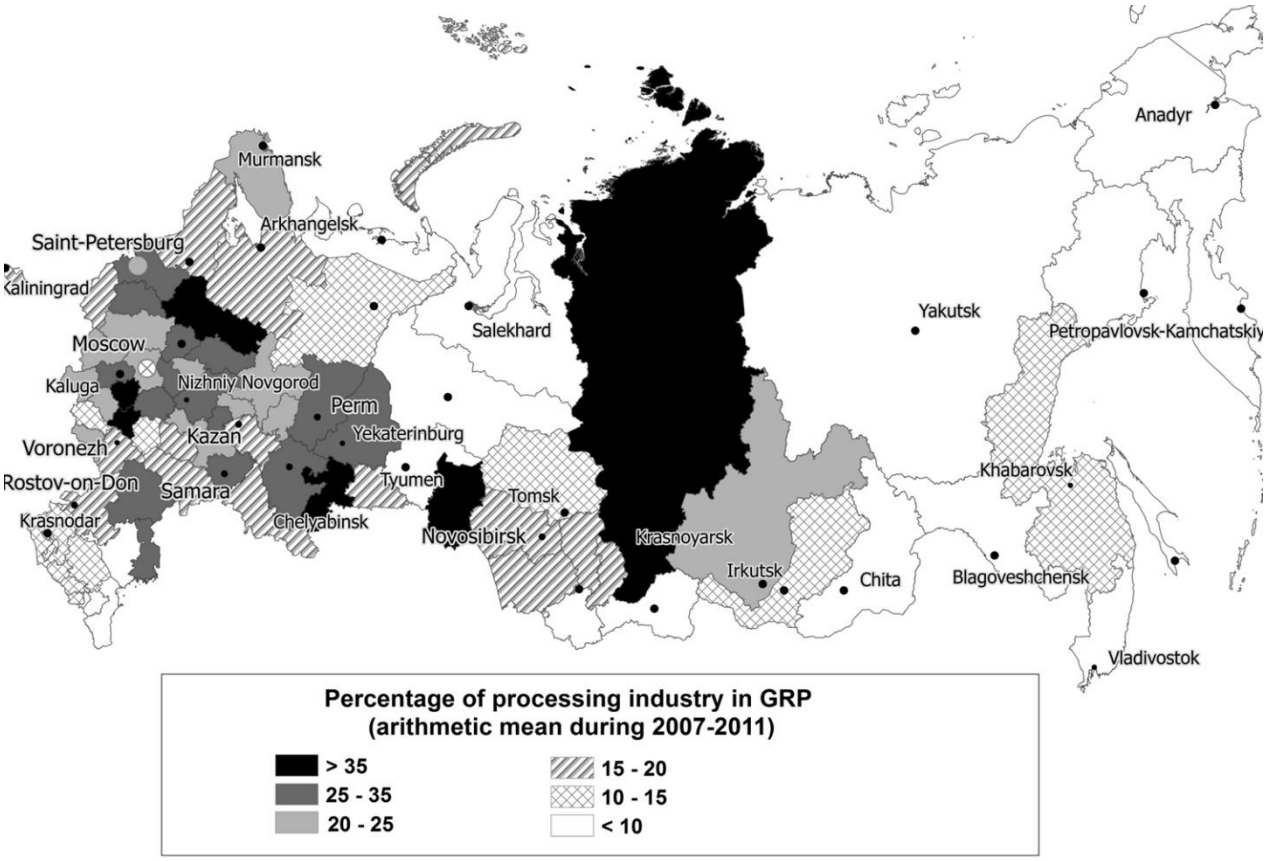

Figure 9. Percentage of manufacturing (processing) industries in GRP

The calculation for the model 2 (*Gazelle_2*) has similar results, so the results, presented above, are robust during the time of post-crisis recovery of the Russian economy.

CONCLUSION: HOW TO SUPPORT GAZELLES IN RUSSIA

Generally, the support measures for SMEs can be divided into two main groups: an institutional climate development and the targeted support of certain companies. Today the main development institutes in Russia actively support small businesses, however, an insufficient number of programs is aimed at supporting gazelles. It should be emphasized that gazelles usually need specific support measures: access to capital, improvement of the regulatory environment, universities' consulting, clusters and special economic zones, tax benefits, stimulating of the entrepreneurial "spirit" in regions.

Particular attention is given to innovative projects (Foundation for Assistance to Small Innovative Enterprises in Science and Technology[13], Fund "Skolkovo"[14], JSC "RUSNANO"[15], etc.). However, a significant part of measures to support innovation refers to the earliest stages of the projects, while gazelles usually require support in the expansion processes.

In Russia, there is a comprehensive system of innovation support:

1) For small innovative enterprises operating under the Federal law-217, the active support is provided by the Fund for Assistance to Small Innovative Enterprises in Science and Technology, established technology parks and business incubators.

2) Medium-sized high-tech growing companies may apply for financial and consulting support to the Russian Venture Corporation[16], RUSNANO or enter the special economic zones[17].

3) For large corporations, there are incentives to increase R&D expenditures, operating by Vnesheconombank[18].

Despite the criticism of the development institutions, most of the elements of innovation infrastructure in Russia have already been created.

Among the existing support measures, we identify a number of initiatives that have a direct positive impact on the development of the gazelles:

1. The "Agency of strategic initiatives to promote new projects"[19] is carrying out activities aimed at improving the business environment in Russia, including the development and

[13] http://www.fasie.ru/
[14] http://sk.ru/news/
[15] http://en.rusnano.com/
[16] http://www.rusventure.ru/en/
[17] http://eng.russez.ru/
[18] http://www.veb.ru/en/index.php
[19] http://asi.ru/eng/

implementation of activities within the "road maps" of the national entrepreneurial initiative and implementation of the investment standard in the Russian Federation.

2. The “Export Insurance Agency of Russia (EXIAR)”[20] provides support to export-oriented small and medium-sized businesses.

3. The "SME Bank"[21] offers credit and leasing programs, which are aimed at supporting small and medium-sized businesses.

4. The "non-bank deposit-credit organization ‘Agency of credit guarantees'[22] provides guarantees for loans to small and medium-sized businesses.

Besides, the criteria for SMEs can be broadened, giving the opportunity for as much companies as possible to take part in different support programs. This will expand the coverage of enterprises eligible to participate in state and local government programs to support small and medium-sized businesses. At the same time, a greater number of gazelles will be able to take part in such programs as well.

***

Small and medium enterprises with a high growth potential may be regarded as one of the main actors of the economic system that can implement the economic recovery. These companies are called gazelles: their average annual real growth rate is about 20% within three years.

The largest number of companies with high growth potential in Russia is concentrated in the manufacturing sector (over 3000 institutions), and they are distributed more evenly across the regions of Russia.

The performed econometric analysis of manufacturing fast-growing SMEs concentration shows that gazelles operate in regions with significant market potential or near them. They take an advantage of the high innovation potential of a region. Human potential of the region has an impact on the growth of manufacturing SMEs. A strategy of rapid growth at a significant period is almost impossible without technical training and relevant knowledge.

Support of manufacturing gazelles will provide a positive multiplicative effect on related sectors. Based on the research results, we suggest to promote the cluster support policy in the Russian regions, based on the best European practices and the success of the pilot Russian regions to form innovative territorial clusters. The main function of these clusters is to promote the interaction between the companies of a cluster to organize events, collaborative projects,

[20] http://www.exiar.ru/en/
[21] http://www.mspbank.ru/
[22] http://www.acgrf.ru/

sports and recreation for the residents. Providing opportunity to save on the economy of scale, clusters are helpful to organize training programs and data centres, general technical support centres and other innovative infrastructure facilities.

A lot is done in Russia to support the development of small and medium-sized businesses. However, in terms of budget cuts in the choice of measures to support small and medium-sized businesses we need to prioritize and support the most promising firms. In our opinion, these are gazelles.

LITERATURE

Acs Z.J., Parsons W. and Tracy S. High-Impact Firms: Gazelles Revisited, Corporate Research Board, LLC Washington, DC 20037 for under contract number SBAHQ-06-Q-0014. 2008

Audretsch D.B., Feldman M.P. Knowledge spillovers and the geography of innovation. Handbook of regional and urban economics. 2004.

Autio E., Arenius P., Wallenius H. Economic impact of gazelle firms in Finland. Helsinki University of Technology, ISIB Working Papers. 2000, №3.

Baburin V., S. Zemtsov The geography of innovation processes in Russia // Vestnik. Mosk. Univ. Ser. 5. Geography. 2013. № 5. C. 25-32.

Baranskiy N. Regional geography and physical and economic geography. Izv. VGO 1. 1946.

Birch D.L. The Job Generation Process: a Report, prepared by the Massachusetts Institute of technology Program on Neighborhood and Regional change for the Economic Develop-ment Administration. US Department of Commerce. Washington: MIT, Press. 1979

Birch D.L., Medoff J. Gazelles. Labor markets, employment policy and job creation. 1994.

Birch D.L. Who creates jobs? The Public Interest. 1981, №65, p. 3–14.

Birch D.L. Job creation in America. New York, 1987

Davidsson P., Achtenhagen L., Naldi. L. Research on small firm growth: a review. 2005

Delmar F., Davidsson P., Gartner W.B. Arriving at the High-Growth Firm. //Journal of Business Venturing. 2003, №18(2), p. 189–216.

Gibrat R. Les Inegalite Economiques, Paris, Librairie du Recueil Sirey. 1931.

Europe INNOVA Gazelles Innovation Panel. Summary and Conclusions from Panel Discussions. Europe INNNOVA, Brussels. 2008.

Mason G., Bishop K., Robinson C. Business Growth and Innovation: The wider impact of rapidly growing firms in city regions. – 2009.

Penrose E. The Theory of the Growth of the Firm. Oxford University Press. 2009.

Porter M.E. The role of location in competition. // Journal of the Economics of Business. 1994, №1(1), p. 35-40.

Porter M.E. Competitive advantage, agglomeration economies, and regional policy. International regional science review. 1996. №19(1-2), p. 85-90.

Rating of innovative regions for the purposes of monitoring and control (version 2013-2.0), developed by the Association of Innovative Regions of Russia (AIRR). URL: http://www.i-regions.org/#eng

Stewart J. Q. Empirical mathematical rules concerning the distribution and equilibrium of population. Geographical Review. 1947. P. 461-485.

Teruel M., De Wit G. Determinants of high-growth firms: why do some countries have more high-growth firms than others? EIM Research Reports (H201107). 2011