Analysis of trends and development forecast of small enterprises in Russia

This article describes the researching results of trends and development tendencies of small enterprises in Russia and its regions. It presents a number of developed economic and mathematical models that describe the structure and distribution of small-scale enterprises depending on the number of employees. Some indicators of small business according to the types of economic activity are presented here. The author considers the production functions reflecting the dependence of turnover on two factors and describes the forecast results of the main indicators of small business in 2030.

Small-scale enterprises, economic and mathematical model, production function, turnover, number of employees, investments, forecasting.

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The President and the Government of the Russian Federation have defined an extensive development and support program for small business in our country. A significant increase in the role of small-scale enterprises in all economic sectors is identified as the main direction here.

This article reviews some results of the author's researches devoted to small business in the whole country and its federal subjects (oblasts, krais and republics). The aim of the study is to analyze developmental mechanism and trends of small enterprises in Russia, as well as to develop the forecasts of small business activity in 2030. The major tasks accomplished during the study were the following:

— analysis of the main characteristics of small enterprises in today's economy of our country and its regions;

— construction of economic and mathematical models describing developmental mechanism and trends of small business and its dynamics;

— forecasting of this economic sector and its elements.

Theoretical and methodological basis of this research consists of the scientific concepts presented in the works of local and foreign scientists in the field of institutional economics, theory of small-scale business, economic and mathematical modeling, management theory; legislative and regulatory acts of governmental authorities, federal laws and regulations of the Government of the Russian Federation relevant to small-scale business.

The methods of logical, economic and statistical, clustered and system analysis, mathematical statistics and econometrics were used

in the study. Such computer programs as "Statistica", "Microsoft Office Excel", "Mathcad", "Maple", "Mathematica" were used to achieve the objectives and process information.

Information base was made by the materials of the Federal State Statistics Service [8, 9, 10], regional and municipal statistics, laws and regulations, periodicals, scientific publications, conferences, symposia, the Internet and author's researching results.

It is known that state ownership had been dominating as the major type of property in Russia and in the Soviet Union till the 1990s. All enterprises were state-owned and most of them were large in size.

The formation of entrepreneurial organizations began in the 1990s. At this particular time, the enterprises owned by individuals and groups of people were established. So, the first cooperatives were set up. They were among the first real private companies. Later, due to the development of laws, they were replaced by various types of small-scale businesses and firms. The number of small-scale enterprises and organizations also increased after privatization in 1992. Small-scale enterprises are the most widespread type of business structures in recent years.

Thus, such entirely new economic sector as small-scale business has been created in the country over twenty years. Of course, it was difficult to form it. The transition from a socialist model to a capitalist model of economy was followed by the economic crisis and high inflation rate. The problems of legal, economic and financial support of the business were not solved in time. The laws aimed at the governmental support for small business didn't keep up with the development of this economic sector. There was a lack of financial support of small-scale enterprises by the state.

As mentioned [11], two ways were used to create small private enterprises. They were small-scale privatization and citizens' initiatives. Small-scale privatization included the transfer of small state-owned enterprises in

trade, services, catering to the ownership of their labor collectives. Later, in most cases the rights of ownership to these firms were concentrated in the directors' power who bought the shares of their employees. The second method was based on the creation of new small private enterprises "from scratch". They belonged initially to one owner or the group of founders, who used their money and other resources. Today the difference between privatized businesses and newly established small enterprises is almost obliterated. While the structure of entrepreneurship was being transformed, the legislation of that economical sector was being changed too.

The basic law of Russia, defining the legislative basis of small-scale enterprises today, is the Federal Law № 209-FL dated July 24, 2007 "On the development of small and medium enterprises in the Russian Federation" [21]. The law determines limiting values in the average number of employees for small business amounted to one hundred people inclusive. There are micro-enterprises among small businesses. It is possible to have up to fifteen employees for them. In addition, there is a restriction of the governmental share in the authorized capital at the rate of 25%. The law points out that the maximum values of proceeds from the sale of goods (works, services), as well as the value of small enterprises' fixed assets are determined each year.

There were 1.594 million of small-scale enterprises in Russia in 2010. About 16.16% of the employed population worked in small-scale enterprises. The total production of small businesses amounted to 15% of GDP. Nevertheless, their developmental level isn't sufficient. There were about 900 small-scale enterprises to one hundred thousand people in Russia on average. This rate is significantly lower than in the European Union and the United States (4500 and 7400 small-scale enterprises, respectively) [20, 23, 26]. *Table 1* shows the economic performances of small-scale enterprises in Russia for the period till 2010.

Small-scale enterprises are specializing in five key areas of activity now: manufacturing, construction, trade, transport and communications, real estate transactions. There is a detailed description of different types of enterprises and a list of their products (services) for each kind of economic activity in "National Classification of Economic Activities" [17].

Distribution of small enterprises' staff and turnover between the main kinds of economic activity is given in *table 2*. It shows that trading companies predominate over small businesses. The shares of manufacturing, real estate, construction and transport enterprises are substantially lower.

It is important to estimate the kinds of small enterprises' activity in the economic sector of our country in order to consider the trends in the development of small business.

The results of this analysis are presented in *table 3*. It shows the share of small-scale enterprises to the total number of companies operating in the relevant kind of economic activity.

Table 3 shows that trade, construction and real estate enterprises occupy a significant place (30%) in their respective sectors according to the number of employees and turnover. Increased production of small businesses in these activities is limited. However, there are prerequisites for a significant increase in the proportion of small enterprises in manufacturing, transport and communications.

The author has hypothesized in her research that the formation of small-scale business in our country and its developmental level could be described through a complex of economic and mathematical models.

Table 1. The dynamics of small-scale enterprises in Russia

Indicator	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
The number of employees, thousand people	6514.8	6207.8	6485.8	6596.8	6483.5	7220.3	7458.9	7815.1	8045.2	8582.8	9239.2	10436.9	10247.5
The number of small-scale enterprises, thousand	861.1	868.0	890.6	879.3	843.0	882.3	893.0	953.1	979.3	1032.8	1137.4	1347.7	1602.5

Table 2. Distribution of small enterprises by the number of employees
and their turnover according to the kinds of economic activity

Kind of activity	The share in the number of employees in small enterprises	The share in the turnover of small enterprises
Trade	0.33	0.67
Manufacturing industries	0.16	0.10
Construction	0.16	0.09
Transport and communications	0.05	0.03
Real estate transactions	0.16	0.07
Other	0.14	0.04

Table 3. The share of small-scale enterprises according to the kind of activity

Kind of Activity	The number of employees in small enterprises	The turnover of small enterprises
Trade	0.28	0.39
Manufacturing industries	0.15	0.11
Construction	0.30	0.43
Transport and communications	0.10	0.10
Real estate transactions	0.32	0.34

This complex includes the models, which describe the structure of small businesses depending on the number of their employees, the distribution of the main indicators of small enterprises by economic activities, as well as the production functions reflecting the manufacturing dependence on two factors. These models should allow us to establish the trends of small-scale business. These trends could help us to solve a wide range of management tasks in small businesses such as institutional support, planning and forecasting of the development of this economic sector.

The study of the tendencies specific to small businesses was based on the author's methodological approach. Its main feature is a consideration of all small-scale enterprises as a single object of research. Appropriateness of this approach is based on the following reasons. There are a lot of small-scale enterprises in each subject (republics, krais, oblasts) of the Russian Federation. The development of economic and mathematical models for each enterprise is laborious. Small businesses operate under single institutional policies, compete in the markets, interact in the process of labour division, provide people, as well as other companies with necessary products. So, the study dealt with the possibility to construct the models that reflect integrated indicators of all small-scale enterprises in each region of the country.

The methodology of economic and mathematical models included the following steps:

✓ selection and justification of the indicators in each model;

✓ infobase identification;

✓ initial data collection and processing;

✓ selection of the dependence type between the indicators in the models;

✓ reasoning of possible development methods for each model;

✓ software identification;

✓ carrying out the computational experiments by each method and alternatives of the required dependencies;

✓ logical and statistical quality analysis of these dependences;

✓ choosing the best models to approximate the initial data.

The characteristics of small-scale enterprises from all regions of the Russian Federation were used as initial data in the creation of the models. We have examined 21 republics, 9 krais and 46 oblasts of our country. The autonomous okrugs and autonomous oblasts haven't been considered in order to eliminate double counting.

The main models developed by the author are presented below:

Formula (1) describes the dependence of the share of small-scale enterprises in the total number of employees in small businesses [14]:

$$y_{p1}(x) = -0.27 + \frac{26}{x - 0.04} \quad \text{at} \quad 1 \leq x \leq 100, \ (1)$$

where $- y_{p1}(x)$ the share of small-scale enterprises with a certain number of employees in the total number of small businesses, %;

x — the number of employees in small-scale enterprises, persons.

The analysis of the obtained dependence (1) allows us to point out the following trends:

• The enterprises numbering up to 15 employees inclusive predominate over small businesses (69%). There are only 9% of enterprises employing more than 50 people.

• With increased number of employees in small businesses, their share in the total number of small-scale enterprises is decreasing monotonically, i. e. there are more companies with a small number of employees than the enterprises with a relatively large staff.

• When the number of workers employed in a small-scale enterprise is approaching to the maximum value (one hundred persons), the corresponding share is vanishing to zero while remaining positive.

Formula (2) describes the dependence of the share of workers employed by small-scale enterprises with a certain number of persons on the total number of employees in these companies [12]:

$$y_{p2}(x) = 3.42e^{(-0.03)x} \quad \text{at} \quad 1 \leq x \leq 100, \quad (2)$$

where $y_{p2}(x)$ —the share of workers employed by small-scale enterprises with a certain number of persons in the total number of employees in small companies, %;

x — the number of employees in small-scale enterprises, persons.

The analysis of the obtained dependence (2) allows us to point out the following trends:

♦ The total number of employees in small-scale enterprises is decreasing monotonically with their increased size, although, this decrease isn't so sharp as in the first regression model.

♦ More than 37% of people are employed by the enterprises numbering less than 15 persons. More than a half of the employees in small businesses work in the enterprises employing less than 25 persons. So, most people employed in small business work in small enterprises.

♦ More than 82% of people are employed by the enterprises numbering less than 50 persons and 18% of employees work in the enterprises employing more than 50 persons.

We used a regression analysis in order to make the functions (1), (2) [4]. We used standard methods, determination and correlation criteria, Fisher's and Snedekor's test [3, 7]. For the functions (1) and (2) the coefficients of determination are $R_1^2 = 0.996$ and $R_2^2 = 0.982$, respectively; correlation coefficients are $r_1 = 0.998$ and $r_2 = 0.991$. All these values are close to maximum possible, equal to unity. Verification by Fisher's and Snedekor's test equal to $F_{tabl} = 6.61$ showed that the calculated values were much higher, as they were $F_{observ1} = 1172.41$ and $F_{observ2} = 270.4$ respectively. It is evidence of high-qualified models.

In addition to the statistical tests of obtained regression functions, we used logical analysis, which examined the functions for their compliance with the basic data on the whole range of factors, the correct description of economic parameters and processes.

The following author's models describe the distribution of three main economic indicators of small-scale enterprises according to five types of activities mentioned above. We have considered the following indicators reflecting the level achieved by small business: the average number of employees per one small-scale enterprise (x_1, persons), the average turnover per one small-scale enterprise(x_3, mln. rub.),as well as the values of turnover per one employee (x_2, thsd. rub.).

Studies have shown that three indicators had been assigned for all types of activities mentioned above according to the so-called log-normal distribution law. So, there are the following probability density functions:

• for small trade companies

$$y_1(x_1) = \frac{93}{0.32 \cdot x_1 \sqrt{2\pi}} \cdot e^{\frac{(\ln x_1 - 1.74)^2}{2 \cdot 0.102}}; \quad (3)$$

$$y_2(x_2) = \frac{59418}{0.46 \cdot x_2 \sqrt{2\pi}} \cdot e^{-\frac{(\ln x_2 - 7.95)^2}{2 \cdot 0.212}}; \quad (4)$$

$$y_3(x_3) = \frac{304}{0.45 \cdot x_3 \sqrt{2\pi}} \cdot e^{-\frac{(\ln x_3 - 2.78)^2}{2 \cdot 0.203}}; \quad (5)$$

• for small manufacturing enterprises

$$y_4(x_1) = \frac{182}{0.31 \cdot x_2 \sqrt{2\pi}} \cdot e^{-\frac{(\ln x_1 - 2.49)^2}{2 \cdot 0.096}}; \quad (6)$$

$$y_5(x_2) = \frac{30400}{0.4 \cdot x_2 \sqrt{2\pi}} \cdot e^{-\frac{(\ln x_2 - 6.78)^2}{2 \cdot 0.16}}; \quad (7)$$

$$y_6(x_3) = \frac{363}{0.49 \cdot x_3 \sqrt{2\pi}} \cdot e^{-\frac{(\ln x_3 - 2.36)^2}{2 \cdot 0.24}}; \quad (8)$$

- for small construction companies

$$y_7(x_1) = \frac{287}{0.4 \cdot x_1 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_1 - 2.32)^2}{2 \cdot 0.16}}; \qquad (9)$$

$$y_8(x_2) = \frac{13680}{0.37 \cdot x_2 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_2 - 6.85)^2}{2 \cdot 0.137}}; \qquad (10)$$

$$y_9(x_3) = \frac{403}{0.48 \cdot x_3 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_3 - 2.26)^2}{2 \cdot 0.23}}; \qquad (11)$$

- for small transport and telecommunication agencies

$$y_{10}(x_1) = \frac{129}{0.34 \cdot x_1 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_1 - 2.07)^2}{2 \cdot 0.116}}; \qquad (12)$$

$$y_{11}(x_2) = \frac{15200}{0.47 \cdot x_2 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_2 - 6.63)^2}{2 \cdot 0.221}}; \qquad (13)$$

$$y_{12}(x_3) = \frac{152}{0.54 \cdot x_3 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_3 - 1.79)^2}{2 \cdot 0.292}}; \qquad (14)$$

- for small real estate companies

$$y_{13}(x_1) = \frac{171}{0.4 \cdot x_1 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_1 - 1.95)^2}{2 \cdot 0.16}}; \qquad (15)$$

$$y_{14}(x_2) = \frac{11400}{0.4 \cdot x_2 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_2 - 6.33)^2}{2 \cdot 0.16}}; \qquad (16)$$

$$y_{15}(x_3) = \frac{101}{0.5 \cdot x_3 \sqrt{2\pi}} \cdot e^{\frac{-(\ln x_3 - 1.37)^2}{2 \cdot 0.25}}. \qquad (17)$$

The testing of these functions was carried out according to Pirson criterion and Kolmogorov-Smirnov criterion. *Table 4* shows that they do not exceed the tabulated values: for Pirson criterion $\chi^2_{0.90}(2) = 4.61$ [2] and for Kolmogorov-Smirnov criterion $K_{0.05} = 0.15$ [6]. This table shows the calculated values corresponding to each of the functions (3) − (17). The results have proved the high quality of all the developed models and the fact that they are approximate to the basic data.

These economic and mathematical models allowed us not only to specify the average number of employees in small firms, turnover per employee and turnover per one small company, but to describe accurately the structure of small-scale business and its main performance indicators. In particular, it is possible to determine the share of enterprises for various intervals, where these parameters are changed, based on the models calculating the certain integrals.

For example, the predominant number of employees in small trade enterprises (more than 93%) is in the range from 3 to 10 people. The turnover of 93% businesses is in the range of 8 to 50 million rubles. The turnover per employee (in 93% companies) is in the range from 600 thousand rubles to 5.5 million rubles. The values obtained can be used, particularly, in the development forecasting of small-scale enterprises belonging to different kinds of activities.

The average characteristics of the industrial structure of small-scale business in the whole country are represented in *table 5*.

The average values of turnover per an employee given in Table 5 were compared with the respective values of this rate for the concerned kinds of activity in the whole country. The comparison showed that the average turnover per an employee in small trade and construction enterprises is higher by almost 30% than the same average national rate. At the same time, the average turnover per an employee in small manufacturing enterprises is lower by 40% than the national rate. In our opinion, this fact is caused by weak technical and technological equipment of small businesses. Therefore, further development of small manufacturing industries should be based on the extensive use of innovation and investment.

In addition to absolute values, we determine the values that characterize small businesses in all regions of Russia, in terms of the share of small-scale enterprises, specializing in the economic activities stated above.

Table 4. The results of the models' test

Kind of activity	Indicator	Performance criterion	Calculated value
Trade	x_1	Pirson	1.03
		Kolmogorov-Smirnov	0.075
	x_2	Pirson	1.14
		Kolmogorov-Smirnov	0.037
	x_3	Pirson	1.13
		Kolmogorov-Smirnov	0.033
Manufacturing	x_1	Pirson	2.45
		Kolmogorov-Smirnov	0.061
	x_2	Pirson	1.13
		Kolmogorov-Smirnov	0.05
	x_3	Pirson	4.56
		Kolmogorov-Smirnov	0.06
Construction	x_1	Pirson	1.27
		Kolmogorov-Smirnov	0.03
	x_2	Pirson	4.44
		Kolmogorov-Smirnov	0.06
	x_3	Pirson	0.43
		Kolmogorov-Smirnov	0.02
Transport and communications	x_1	Pirson	1.79
		Kolmogorov-Smirnov	0.04
	x_2	Pirson	1.13
		Kolmogorov-Smirnov	0.03
	x_3	Pirson	1.11
		Kolmogorov-Smirnov	0.04
Real estate transactions	x_1	Pirson	2.68
		Kolmogorov-Smirnov	0.07
	x_2	Pirson	1.05
		Kolmogorov-Smirnov	0.03
	x_3	Pirson	2.5
		Kolmogorov-Smirnov	0.03

Table 5. Average values of the main rates

Kind of activity	x_1, persons	x_2, thsd. rub.	x_3, mln. rub.
Trade	6	3152	17.83
Manufacturing industries	13	964	11.87
Construction	11	1006	10.89
Transport and communications	8	839	6.84
Real estate transactions	8	608	4.41

At the same time, we have calculated three main indicators, which reflect the characteristics of small enterprises in full:

— the share of small enterprises, specializing in the certain activity in the total number of small businesses (x_4);

— the share of employees number in the small enterprises, specializing in the certain activity in the total number of small business employees (x_5);

— the share of turnover of small enterprises, specializing in the certain activity in the total turnover of small business (x_6).

The studies have shown that the values of these indicators for various regions of Russia are over the small range. That is, the indicator's value is almost independent of the subject's location, its size and the developmental level of small business in it. The results of calculations are presented in *table 6*.

Table 6.The share of small-scale enterprises according to the kinds of activity

Kind of activity	Indicator	Average value	Standard deviation
Trade	x_4	0.4	0.05
	x_5	0.28	0.06
	x_6	0.59	0.09
Manufacturing industries	x_4	0.12	0.03
	x_5	0.17	0.05
	x_6	0.12	0.05
Construction	x_4	0.12	0.02
	x_5	0.16	0.04
	x_6	0.12	0.06
Transport and communications	x_4	0,06	0.01
	x_5	0.06	0.02
	x_6	0.03	0.02
Real estate transactions	x_4	0.16	0.03
	x_5	0.14	0.04
	x_6	0.06	0.02

The table shows that the average quadratic deviations for all considered indicators are rather low. So, we can use these average values to analyze and forecast the development of small business in most regions of our country.

The study has proved that it is possible to create the production functions for a set of small enterprises of our country and its regions. It is known that production functions are economic and mathematical models of production processes. They express steady and regular relationship between resources and production volume in terms of quantity [5].

We have examined the dependence of the final result such as the turnover of small-scale enterprises. Turnover is the main indicator used by the Federal State Statistics Service in assessing of production structures of small-scale enterprises. This figure includes the cost of shipped domestic manufactured goods, own works and services, as well as sales revenues of outsourced goods [19].

It is reasonable to consider the employees' wages (characteristics of labour inputs) and investment in their capital as the most acceptable factors determining the turnover of small-scale enterprises.

The following types of production functions were examined: linear function; constant elasticity of substitution (CES) [1, 18]; Revankar production function [16, 25], Cobb – Douglas production function [22, 24].

The comparison of these production functions have showed that the production function, which is similar to Cobb-Douglas function and different from it by a set of factors, approximates to the basic data best of all.

The production function that is based on the characteristics of small-scale enterprises in the Federal subjects of Russia in 2007 has the following form [13]:

$$y_{rf2007}\ (x_7, x_8) = 7.766 \times x_7^{0.139} \times x_8^{0.930}, \quad (18)$$

where y_{rf2007} — the turnover of small-scale enterprises, bln. rub.;

x_7 — investment in fixed assets of small-scale enterprises, bln. rub.;

x_8 — the wages of employees in small-scale enterprises, bln. rub.

The production function describing the dependence of these indicators for 2008 is the following:

$$y_{rf2008}\ (x_7, x_8) = 6.966 \times x_7^{0.136} \times x_8^{0.981}. \quad (19)$$

The production function for 2009 is the following:

$$y_{rf2009}\ (x_7, x_8) = 6.659 \times x_7^{0.132} \times x_8^{0.961}. \quad (20)$$

There are quality coefficients of three production functions in *table 7*.

The table shows that the coefficients of correlation and determination are close enough to the best value which is equal to unity. Calculated values by Fisher's and Snedekor's test are more than the vales from the table above.

The test of these equations by the use of logical and statistical analysis methods have showed that all production functions are of high quality.

The comparison of three production functions allowed us to come to the following important conclusions about the developmental mechanisms and trends of small business:

— it is possible to describe the dependence of turnover on two factors referred above by the use of power production function;

— all these production functions are similar but they have small differences both in the coefficient of equations and the values of the factor's powers;

— the sum of powers in all equations is higher than unity; this fact proves the growing economy of scale;

— the decrease in the value of function coefficient (6.659 < 6.966 < 7.766) is caused by the lower turnover of small businesses after the economic crisis in late 2008 and 2009.

The analysis of production functions has revealed some important trends of small-scale enterprises in Russia: their turnover grows slightly faster than investments and wages increase; the increase of one factor with the con-stant value of another one leads to the raise in the absolute value of turnover; the increase in turnover of small businesses is possible in the long term; one factor's growth improves the use conditions for another factor; investment turnover flexibility is lower than wage turnover flexibility.

The dependences reflecting the relationship between fixed capital investments and wages of employees have been developed on the basis of these production functions (isocosts, isoquants). In addition, the optimal extension trajectories have been created. They reflect the best ratio of fixed capital investments and wages for a set of all small-scale enterprises in each subject of our country. Production functions and the resulting dependences can be used to assess the level achieved by small-scale enterprises in a particular region, to analyze the efficiency of resource utilization, justify the investment needs and set the targets in the development of long-term plans and projections.

The economic and mathematical models were used to forecast the development of small business in our country in future.

The expected economic performances of small businesses in 2030 have been studied according to the following hypotheses:

1. Criteria for enterprises referring to small-scale business will remain unchanged. In particular, limiting values of the average number of employees will vary from one to one hundred persons inclusive. In addition, restrictions will continue to limit the share of the state structures' participation in authorized capital stock, as well as the maximum values of proceeds from the sale of goods (works, services) and the long term assets of small-scale enterprises.

Table 7. Results of quality control of production functions

The number of function	Coefficient of determination	Coefficient of correlation	Calculated value by Fisher's and Snedekor's test
(18)	0.925	0.962	1172.41
(19)	0.939	0.969	599.95
(20)	0.949	0.974	718.45

2. Output volume of small-scale enterprises in Russia will reach a stage of saturation. Since the share of small-scale businesses in various activity categories is different nowadays, the expected growth of output for each of them will be different.

3. The number of small-scale enterprises will increase, based on the modification (transformation) of the existing large and medium-sized enterprises and by the establishment of new companies.

4. The average number of employees in a small-scale enterprise will not change and remain up-to-date.

5. All financial indicators (prices, wages, investments) are taken at the average up-to-date level, their real values can be recalculated based on the actual inflation rate in 2030.

Each Federal subject of Russia has been calculated severally according to the assumption about the optimal development of small-scale business in order to improve the forecast precision. Comparison of the main rates projected for 2030 with the level achieved by small enterprises in 2010 is given in *table 8*.

Different growth rates of the main indicators are caused by the following facts:

— The growth rates of turnover are supposed to be higher than the growth rates of investment because of increasing economy of scale as the analysis of production functions has shown.

— The growth rates of employees are less than the growth rates of turnover due to the expected increase in labour productivity.

— The growth rates of small-scale enterprises are less than growth rates of turnover and employees, because rapid growth of large-sized small businesses (in manufacturing, transport and communication) is expected.

The following tables present the projected rates in the context of Federal Districts and kinds of activities, as well as for small enterprises different in size.

Table 9 presents the resulting calculations of small-scale enterprises' turnover and investment in their fixed assets in the country and Federal Districts.

Table 10 shows the resulting calculations of the number of small-scale enterprises in the federal districts and our country in whole.

Table 8. The growth rates projected for 2030 in comparison with 2010

Indicators	2010	2030	Expected growth rates, %
Turnover of small-scale enterprises, bln. rub.	18925	71645	379
Investments in fixed capital, bln. rub.	574	1610	280
The number of small-scale enterprises, thsd.	1594	4582	287
Average number of employees, bln. persons.	11.10	35.49	320

Table 9. Expected turnover of small-scale enterprises and investment in their fixed assets in 2030, bln.rub.

	Turnover of small-scale enterprises	Investment in fixed assets
Russian Federation	71645	1610
Central Federal District	33807	423
Including Moscow	25193	218
Northwestern Federal District	7794	100
Southern and North Caucasian Federal Districts	5226	276
Volga Federal District	10699	423
Siberian Federal District	5928	98
Ural Federal District	5974	255
Far Eastern Federal District	2217	35

Table 10. Expected number of small-scale enterprises in 2030

| | The number of small-scale enterprises, thsd. | | | | |
| | In total | Including ranges | | | |
		first	second	third	fourth
Russian Federation	4582	1938	1191	1040	412
Federal Districts					
Central Federal District	1578	667	410	358	142
Northwestern Federal District	541	229	141	123	49
Southern and North Caucasian Federal Districts	520	220	135	118	47
Volga Federal District	964	408	251	219	87
Siberian Federal District	502	213	131	114	45
Ural Federal District	308	130	80	70	28
Far Eastern Federal District	169	71	44	38	15

Small-scale businesses have been calculated according to four ranges of employees. The first range includes small-scale enterprises numbering up to 5 employees, the second range consists of enterprises employing from 5 to 15 persons, the third range involves small businesses employing from15 to 50 people and the fourth range is from 50 to 100 employees. This approach is necessary for taking into account the specifics of small-scale enterprises different in size to form government and regional policy in the sphere of small business development and support. The companies of the selected ranges differ from each other in functioning and management. It influences the development of programs aimed at the improvement of this economic sector.

Then we have determined the number of people employed in small-scale enterprises. These calculations are similar to the calculations referred above: they have been carried out for each federal subject of our country including 4 ranges. The resulting values are given in *table 11.*

The number of managers in small-scale enterprises has been determined during the forecast development according to the optimal values of span of control for small businesses calculated by the author [15]. It is necessary to know the number of managers in order to create training programs and to provide human resource development for small-scale enterprises in Russia. These figures are shown in *table 12.*

The key indicators of small-scale enterprises specializing in five main activities are shown in *table 13.*

The analysis of the main characteristics of small-scale enterprises in today's economy of our country has allowed us to determine the operating rate of these companies and the trends of their dynamics. The study has shown that nowadays small-scale enterprises play a significant role in all regions of our country.

The set of mathematical and economic models developed by the author has allowed her to substantiate a range of developmental mechanisms of small-scale business. These models can be used to monitor small-scale enterprises and to develop long-term plans and forecasts.

The forecast of some indicators of small business in 2030 had been developed on the basis of the developmental mechanisms and the governmental Strategy for Small Business Development in Russia.

The theoretical and practical significance of the study lies in the fact that its conclusions and recommendations including economic and mathematical models can be used as the methodological tools to analyze the developmental mechanisms and trends of small-scale business and evaluate its effectiveness both in separate Federal subjects and in Russia in whole. The results of this study can be applied by the executive authorities in long-term planning of their development.

Table 11.Expected number of employees in small-scale enterprises in 2030

	Average number of employees, thsd. persons				
	In total	Including ranges			
		First	Second	Third	Fourth
Russian Federation	35485	4418	8882	15940	6245
Federal Districts					
Central Federal District	12219	1521	3058	5489	2151
Including Moscow	6342	790	1587	2849	1116
Northwestern Federal District	4190	522	1049	1882	737
Southern and North Caucasian Federal Districts	4030	502	1009	1810	709
Volga Federal District	7464	929	1868	3353	1314
Siberian Federal District	3891	484	974	1748	685
Ural Federal District	2387	297	598	1072	420
Far Eastern Federal District	1306	163	327	586	230

Table 12. Expected number of managers in small-scale enterprises in 2030

	Average number of managers, thsd. persons				
	In total	Including ranges			
		First	Second	Third	Fourth
Russian Federation	5682	884	1480	2277	1041
Central Federal District	1957	304	510	784	358
Including Moscow	1015	158	265	407	186
Northwestern Federal District	671	104	175	269	123
Southern and North Caucasian Federal Districts	645	100	168	259	118
Volga Federal District	1195	186	311	479	219
Siberian Federal District	623	97	162	250	114
Ural Federal District	382	59	100	153	70
Far Eastern Federal District	209	33	54	84	38

Table 13. Key indicators of small-scale enterprises in 2030

Kind of activity	Number of employees, thsd. persons	Turnover, bln. rub.
Trade	7720	39859
Manufacturing industries	5114	9156
Construction	3306	4269
Transport and communications	3629	4578
Real estate transactions	3407	4975

References

1. Bessonov V.A. Constructing problems of production functions in the Russian transition economy. In: The analysis of the Russian transition economy. Moscow: Institute for Economy in Transition, 2002. P. 5-89.
2. Bolshev L.N. Tables of Mathematical Statistics. Moscow: Nauka. Main Edition of Physics and Mathematics, 1983.
3. Dougherti C. Introduction to Econometrics. Moscow: INFRA-M, 1999.
4. Draper N. Applied Regression Analysis. Moscow: Finansy i Statistika, 1986.
5. Kleiner G.B. Production functions: Theory, methods and application. Moscow: Finansy i Statistika, 1986.
6. Cramer H. Mathematical Methods of Statistics. Moscow: MIR, 1975.
7. Kremer N.S. Econometrics. – Moscow: UNITY-DANA, 2002.
8. Small business in Russia. 2008: statistical book ROSSTAT. Moscow, 2008.
9. Small and medium-sized business in Russia. 2009: statistical book ROSSTAT. Moscow, 2009.

10. Small and medium-sized business in Russia. 2010: statistical book ROSSTAT. Moscow, 2010.

11. Microeconomics. Theory and practice in Russia. Ed.by A.G. Gryaznova, A.Y. Yudanova. Moscow, 2002.

12. Pinkovetskaya Yu.S. Small business in the regions of the Russian Federation: the production function. Problems of management theory and practice. 2009. No. 9.P. 100-106.

13. Pinkovetskaya Yu.S. Production function for small business management in the Russian Federation. Vestnik of Moscow University. Series 21: Management (State and Society). 2010. No. 1. P. 79-88.

14. Pinkovetskaya Yu.S. The number of small businesses in the Russian Federation: Results of analysis. Regional economy. 2009. No. 2. P. 224-229.

15. Pinkovetskaya Yu.S. Economic and mathematical models of improving small-scale enterprises' activity. Economics and Humanities. 2009. No. 3 (209). P. 25-31.

16. Plakunov M.K. Production functions in the economic analysis. Vilnius: Mintis, 1984.

17. Tax Help. Russian Classification of Economic Activities. Available at: http://www.okvad.ru.

18. Terekhov L.L. Production functions. Moscow: Statistics, 1974.

19. Federal State Statistics Service. Small and medium-sized business. 2010: Methodological notes. Available at: http://www.gks.ru/bgd/regl/b10_47/IssWWW.exe/Stg/metod.htm.

20. Federal State Statistics Service. Available at: http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/enterprise/reform/

21. On the development of small and medium enterprises in the Russian Federation. Federal Law No. 209-FL dated July 24, 2007.

22. Cobb C.W. Theory of Production. American Economic Review. Supplement, 18, March 1928. P. 139-165.

23. European Commission. Available at: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/index_en.htm#h2-sba-fact-sheets.

24. Humphrey T.M. Algebraic Production Functions and their Uses before Cobb-Douglas. Federal Reserve Bank of Richmond Economic Quarterly. 1997. No. 83(1). P. 51-83.

25. Revankar N.S. A Class of Variable Elasticity of Substitution Production Functions Econometrics. 1971. Vol. 39. No. 1.

26. The small business economy. A report to the President: United States Government Printing Office. Washington, 2009.