Diagnostics and monitoring of economic entities security

Elena V. Karanina^{1,}, Olesya A. Ryazanova¹, Alexander N. Timin¹, Larisa P. Domracheva¹*

¹Vyatka state University, Moscow str., 36, Kirov, 610000, Russia

Abstract. The article shows the place and role of economic entities in the system of economic security of territories. Various approaches to the definition of the term "economic security of small businesses" are considered. The main factors and threats to the economic security of economic entities of the territories are presented. Presents the author's system of basic indicators of estimation of economic safety of economic entities of the territory. Offers on carrying out diagnostics and monitoring of risks are given. Recommendations as a rating of economic security of economic entities of territories are given. The procedure for monitoring the economic security of economic entities of the territories based on a risk-based approach can be represented in the form of five interrelated stages. This is the stage of collecting data on enterprises and the calculation of the necessary indicators. The stage of formation of the system of indicators, they are risk factors. Stage of processing indicators. The stage of building an integrated model of potential and risk assessment. In addition, the final stage of assessment of the complex level of economic security of economic entities of the territories. This will allow making management decisions in the field of development and support of small businesses at the territorial level.

1 Introduction

The state of economic security of small businesses is one of the key conditions for sustainable economic development of the territories. It determines its position in the system of regional and national security. Small business at the territorial level was the first to occupy a niche of economic activities that are focused on meeting regional and local needs. In all regions of the country, small businesses use local resources by 80% [1]. They meet the needs of the local market by 85%. At the same time, more than 95-98% of economic entities of the territory operate as a small enterprise.

The dynamics of small business development has been negative recently. The share of small enterprises in the turnover of enterprises in the economy as a whole is decreasing. The share of exports of these enterprises in the total volume of exports of the Russian Federation is not more than 6%. Innovation and investment activity remains extremely low. Insufficient effective demand and low level of development of business infrastructure of certain territories hinder effective business activity.

* Corresponding author: kafinanc@yandex.ru

Crisis phenomena in the domestic economy aggravated the negative background of the small business sector. The economy is in a turbulent state. As a result, small business is affected by a number of negative factors and conditions (e.g., the dynamics of the tax burden, the growth of inflation, the deterioration of the investment climate, the decline in income, etc.). This has a negative impact on the cost of production and business efficiency, investment objectives, financial stability and economic security of economic entities of the territories.

In Russia, there is an urgent need to form a fundamental theory of economic security at the level of economic entities of the territories. The problem of evaluation and monitoring of economic security of small business is poorly investigated. Factors of economic security of territories are ambiguously interpreted. The studies do not contain practical recommendations for the evaluation of factors and the use of techniques in the work. The study of the development of the system of diagnosis and monitoring of economic security of territories and the use of risk-based approach will partially eliminate the existing gaps.

2 Materials and Method

Small business depends on numerous external (economic, political, organizational, etc.) and internal (financial and non-financial) factors. The main factors that determine the level of economic security of economic entities of the territories are shown in figure 1. However, not all of them can be objectively evaluated.

The degree of relevance and usefulness of the assessment of the level of economic security and the necessary measures to prevent and minimize the risk depend on the accuracy of the identification of threats, on the correct choice of criteria and indicators for their measurement.

The procedure for monitoring the economic security of economic entities of the territories based on risk-oriented includes five main stages.

At the first stage, it is necessary to collect data about the company and calculate the necessary indicators. They reflect the efficiency of the enterprise, investment attractiveness for business owners, efficiency of labor resources, investment activity, as well as the concentration of own investment resources.

At the second stage, it is necessary to form a system of indicators that are risk factors. The main risks of financial and economic activity of any business entity are associated with the loss of solvency, liquidity, dependence on external sources of financing. The main risk factors are the indices of solvency, reliability, scoring, liquidity, credit risk, financial risk (advantage ratio).

The methodology for assessing economic security includes indicators calculated based on accounting (financial) statements and data of information and analytical systems (special paid services). They act as a tool to reduce commercial risks [2]. Today in Russia the market of specialized, aimed at checking the counterparty, information and analytical systems is actively formed (for example, Integrum, SPARK, Seldon.Basis and "Globass-i", etc.). These systems assess the reliability of the company, as well as its financial condition.

Fig. 1 System of main factors of economic security of economic entities.

Processing of indicators is carried out at the third stage. It includes refined preprocessing (for missing data or incorrect values). Further, all indicators are transferred to a single standardized scale from 1 point (the worst result, for example, the minimum potential or maximum risk) to 100 points (the best result — the maximum potential or minimum risk). Translation of indicators for the enterprise is based on linear scaling formulas 1, 2. For the indicator "average number of employees" transfer conditional (indicator of scale). As a result, all indicators acquire a single dimension (points) and a single scale of changes.

$$x_{in}^n = \frac{x'_{in} - x_i^{\min}}{x_i^{\max} - x_i^{\min}} \cdot 99 + 1 \quad (1)$$

$$y_{jn}^n = 100 - \frac{y'_{jn} - y_j^{\min}}{y_j^{\max} - y_j^{\min}} \cdot 99 \quad (2)$$

The integrated assessment is based on the fourth stage on the comparison of the generalized characteristics of the potential and the generalized risk. The division of the objects of research into clusters is carried out by the method of point estimation and determination of the integral indicator of economic safety assessment of the territory for ranking of enterprises within the cluster (formulas 3, 4, 5). Comparative evaluation is carried out to assess the purity and correctness of the score. Ward and K-means methods are used. This allows us to estimate the coincidence of clusters.

$$X_n = \frac{x_{1n}^H + x_{2n}^H + x_{3n}^H + x_{4n}^H + x_{5n}^H + x_{6n}^H}{6} \quad (3)$$

$$Y_n = \frac{y_{1n}^H + y_{2n}^H + \dots + y_{6n}^H}{6} \quad (4)$$

$$I_n = \sqrt[2]{X_n \times Y_n} \quad (5)$$

At the final fifth stage, the level of economic security of economic entities of the territories is assessed. On their basis, management decisions are made in support of economic entities of the territories.

Based on allocation of four types of the enterprises on potential and three — on risk level, formation of 12 clusters of economic entities is possible.

Table 1. Possible types of clusters.

Cluster	Characteristic
1	High potential-low risk
2	High potential-moderate risk
3	High potential — high risk
4	Moderate potential-low risk
5	Moderate potential-moderate risk
6	Moderate potential-high risk
7	Low potential-low risk
8	Reduced potential-moderate risk
9	Low potential — high risk
10	Low potential-low risk
11	Low potential-moderate risk
12	Low potential — high risk

For the diagnosis and monitoring of economic security of economic entities of the territories were formed initial data (database of enterprises) for 2016. It includes indicators of 1502 organizations (single-industry towns) of the Kirov region (including 1459 small businesses). The base of enterprises was formed according to the information Agency Credinform [3].

3 Discussion

The concept of "economic security" and the factors determining it are revealed in the works of V. I. Boboshko (2014), S. E. Lauhina (2012), E. V. Karanina (2016, 2017), S. G. Simonov (2014), M. A. Khamatkhanova (2013), D. A. Safonov (2014), S. G. Simonova (2014), A. G. Durova (2014), A. A. Kizim (2016), P. A. Salakhova (2016), O. I. Vasilchuk (2011), A. S. Loseva, etc. [4-10] Also in these studies the methods, techniques and models of evaluation of economic security of subjects of small business.

Modern economists have no consensus on the definition of the term. Part of the authors connects the concept of "economic security of small businesses» with the capabilities and abilities to effectively use the resources of the enterprise to ensure sustainability, to prevent threats. It is also necessary for the stable functioning and development of the business. Other

authors connect with the state of security of the enterprise, its capital and resources from various threats. In our opinion, "economic security of small businesses" is a state of security of the economy of an economic entity, which is characterized by the availability of opportunities to ensure dynamic growth, a stable level of financial stability, regardless of external and internal factors that have a negative impact. To assess how risky or safe a business entity is, evidence-based tools are required. We need methods based on a system of criteria and indicators for assessing economic security. They will help to form ratings.

Diagnosis and monitoring of economic security of economic entities of the territories will allow assessing the security threats, the degree of their manifestation in the activities of the economic entity. This will allow forming a list of measures to neutralize threats in the future. This will determine the territory and scope of business for the long-term development of the economy of the territory and the region. Indicative analysis is the best method of diagnostics and monitoring of economic security of economic entities of territories.

4 Results

We analyze the distribution of enterprises in clusters by the method of scoring in the context of territories and industries (table. 2, 3). In total, the sample included 955 small businesses. 387 enterprises (or 40.5%) belong to the seventh cluster (Fig. 2), 207 — to the eighth cluster (or 21.7%). This generally suggests that the greater the number of small businesses refers to businesses with low potential and low or moderate level of risk. 175 enterprises (or 18.3%) have moderate potential at different risk levels. 65 enterprises (or 6.8%) have high potential and 92 enterprises (or 9.6%) have low potential [11].

Table 2. Distribution of economic entities by clusters in the context of territories by the method of point estimation.

Single-industry municipality	Clusters												Subtotal
	1	2	3	4	5	6	7	8	9	10	11	12	
the city of White Kholunitsa	1	0	0	3	5	5	17	12	3	0	3	3	52
the city of Vyatskie Polyany	6	0	0	12	25	4	101	40	3	0	21	5	217
city of Kirovo-Chepetsk	37	11	0	12	57	18	174	96	7	1	21	13	447
the city of Kirs	0	0	0	1	4	2	14	10	2	0	3	2	38
the town of Luza	4	0	0	1	1	1	9	10	4	0	1	0	31
city of Omutninsk	2	0	0	0	7	2	32	7	6	1	6	3	66
the city of Urzhum	1	0	0	2	4	0	11	9	0	0	2	2	31
the urban-type settlement of Lokot	0	0	0	0	1	1	9	8	1	0	0	1	21
an urban-type settlement of Krasnaya Polyana	1	0	0	0	2	1	14	4	2	0	1	0	25
an urban-type settlement of Murygino	1	0	0	0	2	0	5	10	1	0	2	1	22
an urban-type settlement of Strizhi	1	0	0	0	1	1	1	1	0	0	0	0	5
Subtotal	54	11	0	31	109	35	387	207	29	2	60	30	955
Specific weight of clusters, %	5,7	1,2	0,0	3,3	11,4	3,6	40,5	21,7	3,0	0,2	6,3	3,1	10,0

Table 3. Distribution of economic entities by clusters in the context of economic activities by the method of point estimation.

Sections of economic activities	Clusters												Total	The proportion of section %
	1	2	3	4	5	6	7	8	9	10	11	12		
Agriculture, forestry, hunting, fishing and fish farming	1	0	0	0	2		12	13	1		3	2	34	3,56
Extraction of minerals	0	0	0	0	0	0	1	0	0	0	2	0	3	0,31
Manufacturing activity	7	0	0	5	17	7	66	48	5	1	10	3	169	17,7
Provision of electricity, gas and steam; air conditioning	3	0	0	0	3	3	5	3	1	0	2	0	20	2,09
Water supply; water disposal, waste collection and disposal activities, pollution elimination	0	0	0	0	0	2	4	2	0	0	0	1	9	0,94
Construction	7	0	0	3	9	3	42	30	1	0	3	2	100	10,5
Wholesale and retail trade; repair of motor vehicles and motorcycles	6	1	0	7	34	8	104	52	9	1	15	4	241	25,2
Transportation and storage	1	1	0	2	6	1	20	10	5	0	2	1	49	5,13
Activities of hotels and catering establishments	0	0	0	0	7	1	21	10	2	0	1	3	45	4,71
Information and communication activities	1	0	0	0	2	0	8	3	0	0	3	3	20	2,09
Financial and insurance activities	1	0	0	5	2	2	8	2	0	0	3	1	24	2,51
Real estate operations	16	6	0	2	10	3	30	16	3	0	5	1	92	9,63
Professional, scientific and technical activities	4	2	0	2	3	0	16	5	0	0	3	1	36	3,77
Administrative activities and complementary services	4	1	0	2	5	2	14	3	1	0	5	3	40	4,19
Education	0	0	0	1	1	2	5	1	1	0	0	0	11	1,15
Health and social services activities	0	0	0	1	2	0	10	1	0	0	0	2	16	1,68
Activities in the field of culture, sports, leisure and entertainment	1	0	0	0	1	0	5	1	0	0	0	0	8	0,84

Provision of other services	2	0	0	1	5	1	16	7	0	0	3	3	38	3,98
Subtotal	54	11	0	31	109	35	387	207	29	2	60	30	955	100
Specific weight of clusters, %	5,65	1,15	0,00	3,25	11,41	3,66	40,52	21,68	3,04	0,21	6,28	3,14	100	-

Fig. 2. Distribution of economic entities by clusters, %.

The distribution of economic entities into clusters in the context of economic activities provides information about the sectoral specialization of small business, as well as the level of potential and risk of each industry. The most popular activity is wholesale and retail trade. Its share in the sample of economic entities is 25.2%. Of the 241 enterprises in this industry, 104 enterprises belong to the seventh cluster, 52 — to the eighth cluster. This is due to relatively low performance, few staff and low or moderate risk. That is why this area traditionally occupies a leading position in the number of small businesses.

The second largest area is the manufacturing industry (mainly the production of bread, lumber, sawing and planning of wood, plastics, clothing, brick, etc.). This sector accounts for 17.7%, or 169 enterprises. Most enterprises belong to the seventh and eighth clusters.

Construction is another industry in the economy of monterrey Kirov region. There are 100 companies (10.5 per cent). Of these, 72 enterprises belong to the seventh and eighth clusters.

Another important branch of small business is real estate transactions. There are 92 enterprises (9.6%). 30 of them belong to the seventh cluster, 16 business entities — to the first and eighth clusters. This together is more than 67% of the total number of economic entities. In this area, the maximum number of enterprises is concentrated, they belong to the first cluster (increased potential — low risk). This indicates its attractiveness for creditors (investors). The least popular areas of business are mining, as well as education, activities in the field of health and social services, in the field of culture, sports, leisure and entertainment.

5 Conclusions

Thus, the diagnosis, monitoring of economic security of economic entities of territories and building a rating on its basis depend on the goals and requests of the user. The system also depends on various factors (e.g. information, time, methodological, personnel and technical support). The proposed system has a high level of practical value for all business structures and other stakeholders, which consists in the possibility of:

- Interpretation of the ranking of economic security management of existing actors of the territories;

- Improvement of the regulatory and legal support of the organizational and methodological mechanism of the system of diagnostics and monitoring of the economic entities of the territories;

- Improvement of the passports of investment attractiveness for monterrery Kirov region;

- Implementation of a new risk - based approach to calculating the discount rate within the methods of cumulative construction and average return on assets and capital for valuation organizations;

- Development of software and analytical support for diagnostics of indicators of economic security of economic entities of territories;

- development of an algorithm for making management decisions on the results of monitoring the factors of economic security of economic entities of the territories on the basis of an integrated risk-based approach.

References

1. E. Agalarova, Polythematic network electronic scientific journal of the Kuban state agrarian University **77**, 959-968 (2012)
2. E. Karanina, O. Ryazanova, Economy and management: problems and solutions **8**, 327-331 (2016)
3. V.I. Boboshko, N. Boboshko, Bulletin of Kostroma state University **20**, 76-80 (2014)
4. O. Vasilchuk, Innovative development of the economy **3**, 17-26 (2011)
5. S. Ivanov, Vestnik St. Petersburg University of state fire service of EMERCOM of Russia **1**, 114-129 (2009)
6. A. Kizim, P. Salakhov, K. Lukyantseva, Proceedings of the SKAGS **3**, 137-145 (2016)
7. V. Korotkova, Innovative development of the economy **6(36)**, 262-265 (2016)
8. S. Simonov, A. Durava, Journal of Cybernetics **3(15)**, 47-56 (2014)
9. E. Karanina, Economics and management: problems, solutions **3**, 96-103 (2017)
10. E.V. Karanina, O.A. Ryazanova, A.N. Timin, Advances in Intelligent Systems and Computing, **692**, 318-325 (2018)
11. E.V. Karanina, O.A. Ryazanova, N. Gritsuk, MATEC Web Conf., **193** 02004 (2018)