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**RISKS OF INTERACTION BETWEEN GOVERNMENT BODIES AND BUSINESS STRUCTURES
IN THE RUSSIAN AGRICULTURAL SECTOR**

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Abstract

This article aims to provide a justification of the risks of interaction between government bodies and business structures in the agricultural sector. For modern society, the scientific study of entrepreneurship is characterized by an extremely wide range of theoretical and methodological approaches. The purpose of this study is to improve the methodological support for the interaction of government bodies and business structures in the agricultural sector. Following the goal, the authors concentrated on the following objectives. They have investigated the most significant obstacles that hinder the formation, functioning, and development of Russian entrepreneurship in the agricultural sector and studied an approach that views interaction risks as a measure of deviation from the goals of society, business, and entrepreneurship. The authors have also developed a proposal on understanding the problem of harmonizing the goals of economic macro-system entities and the relationships describing this problem, as well as studied the potential for managing the main risks of interaction between government bodies and business structures, based on which they have made proposals for implementation. Practical implementation of the theoretical results obtained allows to develop and improve the mechanism for managing the interaction between government bodies and business structures in the agricultural sector, considering the associated risks, simulating public policy in the field of public-private partnership, and reducing risks for participants of this kind of partnerships and projects in general.

Keywords

Agricultural sector – Risk – Business structures – Government regulation – Government bodies

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Introduction

The current state of the economy has revealed the imperfection of various aspects of managing economic systems, from the level of a small enterprise to the global economy. Among the fundamental problems that need to be resolved and have acquired particular relevance, shortcomings have been revealed in the sphere of relations and interactions between government bodies and business structures. These include, first of all, those where the solution is aimed at ensuring the sustainable development of Russia in conditions of economic turbulence¹.

State support for entrepreneurship can be considered as one of the manifestations of government intervention in economic and social life. Although several theories explain this phenomenon, the effectiveness of state support for entrepreneurship is not high. The importance of state support, especially of small entrepreneurs, is directly related to the insufficient survivability of such business entities, which is necessary to ensure the required level of socio-economic stability of society. The fundamental problems of the inefficiency of state institutions hamper the development of entrepreneurship in Russia.

For modern society, the scientific study of entrepreneurship is characterized by an extremely wide range of theoretical and methodological approaches. They are devoted to the processes of formation and development of entrepreneurship and its interaction with government bodies in certain areas of the economy.

A. Smith based his views on the concept of a free market with the figure of the “economic man”. No individual will think about social interests, he will strive only for his personal benefit, and in this case like in many others, he will be guided by an invisible hand that will take him to the goal having nothing in common with his intentions². A representative of economic romanticism, J.C.L.S. de Sismondi, did not agree with A. Smith, saying that Due to the incorrect distribution of income, economic crises of overproduction occur, as workers present less and less demand for goods³. He was a supporter of the principle of state intervention in a market economy.

A.C. Pigou believed that sometimes, when the inter-relations of the various private persons affected are highly complex, the government may find it necessary to exercise some means of authoritative control in addition to providing a bounty. No ‘invisible hand’ can be relied on to produce a good arrangement of the whole from a combination of separate treatments of the parts. It is, therefore, necessary that an authority of wider reach should intervene⁴.

According to M. Friedman, suppression of inflation impedes the functioning of the market system. The government is forced to create a substitute for a market system that is extremely inefficient⁵.

¹ V. D. Sekerin; M. N. Dudin; A. E. Gorokhova; V. I. Gaiduk & V. I. Volkov, “Creation of A Virtual Image: Digital Technology of The 21st Century”, Amazonia Investiga, Vol: 8 num 20 (2019): 340-348

² A. Smith, An inquiry into the nature and causes of the wealth of nations (LeGrand: 1791).

³ J. C. L. de Sismondi, Nouveaux principes d'économie politique, ou de la Richesse dans ses rapports avec la population (Moscow: Sotsekgiz, 1935).

⁴ A. C. Pigou, The Economics of Welfare (London: Macmillan and co. 1920).

⁵ M. Friedman, Capitalism, Freedom and Democracy (Chicago: 1962).

It should be noted that evaluations of the effectiveness of enterprise assistance programs can differ. For example, M. Almus, S. Prantl⁶, and R.S. Jarmin⁷ in their works justified the effectiveness of state support to business.

According to F. Bergstrom, the support of entrepreneurial structures does not contribute to the growth of companies' productivity⁸. F. Pfeiffer and Reis⁹, in their study, argue that state regulation of business structures in East Germany harms entrepreneurs. In turn, M. Almus, based on his research on companies that have been operating for more than 5 years, substantiates the positive effect of subsidies on employment growth. The authors of¹⁰ believe that the initial conditions for the formation of a new business, in particular, various types of state aid, are crucial in explaining their subsequent market dynamics.

At the same time, entrepreneurship is constantly faced with new problems, which creates the need for further study of this phenomenon. State regulation of agricultural production is carried out in all countries of the world regardless of the socio-economic system given the strategic importance of the agricultural sector (AS) to ensure the national security of any country. Studies confirm that in most cases the largest amount of budgetary funds is allocated to state support programs for agricultural producers¹¹.

It is important to reduce and prevent the development of contradictions between the existing system of public administration and agricultural business, as well as to increase the viability of small and medium-sized businesses based on the management of risks arising from the interaction between government bodies and business structures, which to a large extent predetermined the choice of the research topic and its goals and objectives.

⁶ M. Almus & S. Prantl, "The Effects of Start-up Assistance on Firm Performance", *Journal of Economics and Statistics (Jahrbücher für Nationalökonomik und Statistik)*, Vol: 222 (2002): 161-185.

⁷ R. S. Jarmin, *Government Technical Assistance Programs and Plant Survival: The Role of Plant Ownership Type*. Centre for Economic Studies. Discussion Paper 99-2 (US Bureau of the Census. Washington DC: 1999).

⁸ F. Bergstrom, "Capital Subsidies and the Performance of Firms", *Small Business Economics* Vol: 14 (2000): 183-193.

⁹ F. Pfeiffer and Reis, "Business Start-up by the Unemployed: an Econometric Analysis Based on Firm Data", *Labor Economics*. Vol: 7 (2000): 629-633

¹⁰ V. D. Sekerin & A. E. Gorokhova, *Assessment of the Russian Company Readiness for Transformation of a Management System*. The 12th International Days of Statistics and Economics, Conference Proceedings. Prague. 2018. 1536-1545; A. I. Trubilin; V. I. Gayduk; E. N. Belkina; S. A. Kalitko & A. E. Gorokhova, "Infrastructure of the regional agrifood market: peculiarities of functioning and methods of improvement", *Espacios*, Vol: 38 num 33 (2017) y V. D. Sekerin & A. E. Gorokhova, *New Approach to An Assessment Of Influence Of The Fourth Industrial Revolution Technologies On Economy*. The 13th International Days of Statistics and Economics, Conference Proceedings, Prague. 2019. 1340-1349.

¹¹ V. I. Gaiduk; Yu. A. Nikiforova & S. V. Gladkii, "Opyt gosudarstvennogo regulirovaniya selskokhozyaistvennogo proizvodstva v Evrosoyuze", *Mezhdunarodnyi selskokhozyaistvennyi zhurnal*, num 1 Vol: 367 (2019): 63-66 y V. I. Gaiduk; S.A. Kalitko; Yu. A. Nikiforova & M. G. Paremuzova, "Vliyanie gosudarstvennogo regulirovaniya selskokhozyaistvennogo proizvodstva na obespechenie proizvodstvennoi bezopasnosti Rossii", *Ekonomika, trud, upravlenie v sel'skom khozyaistve*, num 8 Vol: 41 (2018): 49-54.

Methods

The theoretical and methodological basis of our study was the research of Russian and foreign scientists on the problems of relations between the government and the agrarian business, as well as studies on the adaptation of a systematic approach to the economy¹². The article examines Russian and foreign experience in supporting and developing entrepreneurship. In this study we used a systematic approach to the study of economics, risk management theories and also considered the results of game theory, the mainstream theory, and computable general equilibrium models.

Results

In the process of the study, we proved that the issues of interaction between government bodies and business structures in the AS have not been sufficiently developed. According to A. Ermakov, entrepreneurship constantly faces new problems, which necessitates the further development of scientific approaches to studying the phenomenon of entrepreneurship, adaptation, refinement, and revision of certain scientific provisions developed earlier, the development and application of new approaches that are adequate to modern socio-economic, political, legal, technological and other realities¹³.

An analysis of Table 1 shows that in 2017, the trend of an increase in agricultural production volumes continued (2.7 p. p. in relation to 2016) and this was largely due to an increase in livestock production (6.1 p. p.). However, the reduction in crop production by 3 billion rubles indicates that it stayed at a previously achieved level. Concerning changes in the structure of production, it is worth noting a significant decrease (more than 4 p. p.) in the share of agricultural producers in crop production, which, against the background of maintaining production at the level of 2016, indicates an increase in the share of small forms of management, although this dynamics can also be observed in the livestock industry and in general for total agricultural products.

Indicator	2008	2013	2014	2015	2016	2017	2017 in % to	
							2008	2016
Agricultural products produced in all categories of farms								
Crop production	1,306	1,919	2,222	2,791	3,036	3,,033	232.18	99.91
Livestock breeding	1,155	1,768	2,097	2,374	2,470	2621	226.91	106.11
Total	2,461	3,687	4,319	5,165	5,506	5,654	229.71	102.69
Share of products produced in agricultural organizations								

¹² O. Ya. Kravets; E. E. Krasnovskiy; I. V. Kryuchkova; E. V. Bolnokina & V. D. Sekerin, "Mathematical simulation of dynamics on the basis of analysis of multidimensional time series with consideration for lagged influence of factors using neural networks", *International Journal of Engineering and Advanced Technology*, Vol: 8 num 3 (2019): 163-167 y O. V. Kitova, V. M. Savinova, L. P. Dyakonova, S. N. Bruskin, A. A. Beshmelnitskiy, T. P. Danko & V. D. Sekerin, "Information-Analytical System For Forecasting Indicators Of The Social And Economic Sphere Of The Russian Federation", *European Research Studies Journal*. Vo: 20 num 4A (2017): 275-283.

¹³ A. A. Ermakov, "Voprosy vzaimodeistviya vlastnykh i predprinimatelskikh struktur v sovremennoy Rossii", *Finansovyi biznes*, num 2 (2011).

Crop production	48.81	43.81	43.83	46.83	48.55	44.06	-	-
Livestock breeding	47.28	51.77	55.56	56.88	57.35	56.56	-	-
Total production	48.09	47.63	49.53	51.45	52.50	49.85	-	-
Share of products produced in farm enterprises								
Crop production	12.80	14.48	14.87	16.48	17.68	16.45	-	-
Livestock breeding	4.16	4.72	4.74	4.85	5.17	5.20	-	-
Total production	8.74	9.80	9.95	11.13	12.06	11.24	-	-

Table 1

Dynamics and structure of agricultural products of the Russian Federation, billion rubles¹⁴

Risk is an integral attribute of entrepreneurial activity. The uncertainty of the environment, in which the entrepreneur has to act, causes risk, its mandatory characteristic. During the period of economic recessions, for most entrepreneurs, risks increase, which leads to serious socio-economic consequences for the whole society¹⁵.

The global financial and economic crisis has actualized the conduct of theoretical studies aimed at increasing the stability of the AS economy, ensuring the survivability of economic entities and reducing social consequences of a negative nature. Entrepreneurs needed a variety of support measures, on a systematic basis and including financial instruments, tax policy, administrative resource of the government at all levels, etc.

The crisis showed that it was important for the authorities to maintain the stability of AS enterprises using credit instruments, state guarantees, interest rate subsidies, restructuring tax debts, government orders, customs and tariff policies, etc. For small and medium-sized agricultural enterprises, the effectiveness of state support was not so evident. Thus, the effectiveness of regional systems for small business support in the crisis conditions turned out to be rather low (Table 2). Government support measures were directed mainly at large agricultural holdings. Organizations of small and medium-sized agricultural businesses were virtually deprived of support, which characterizes the lack of detail in the systematic approach to this problem.

Indicator	Year					2017 in %		
	2012	2013	2014	2015	2016	2012	2013	2015
Russian Federation	20,800	19,815	19,375	18,528	11,250	54.0	58.1	60.7
Southern Federal District	1,723	1,831	1,313	19,09	1,156	67.1	63.1	60.6
Krasnodar region	645	810	205	613	375	58.1	46.3	61.2

Table 2

Analysis of the volume of subsidies allocated to small businesses from the federal budget (including farm enterprises), million rubles¹⁸

We developed the scientific foundations necessary *to create a model of the system of risks arising from the interaction between government bodies and business structures*. The systemic paradigm in economics and synergetics are used as the scientific foundations of this model. Based on these foundations, we reviewed economic systems, including the government bodies and business entities, which we propose *to classify*

¹⁴ Sait Federalnoi sluzhby gosudarstvennoi statistiki. Available at: <http://www.gks.ru>

¹⁵ V. I. Gaiduk; A. A. Ermakov; S. A. Kalitko & S. V. Gladkii, "Predprinimatelskie riski v agrarnom biznese i ikh funktsii", Vestnik Altaiskoi akademii ekonomiki i prava, Vol: 5 num 1 (2019): 35-39.

according to the intensity and nature of interaction with other systems. Moreover, we determined the level of necessary interaction based on the goals of each element of the system and system-wide goals. These goals can be both internal (endogenous), that is, formulated and implemented within the system, and external (exogenous) when other economic systems act on this system based on their interests and objectives. The intensity of interaction between economic systems and their entities, depending on their goals, can vary from a high level of support to a high level of destructive actions concerning other subjects of the macrosystem. In the absence of interaction between systems, they are in a situation of mutual indifference (i. e. indifferent to each other).

Discussion

The nature of the interaction of economic systems is determined by the economic nature of this type of interaction. For example, this can be an interaction based on the calculation and payment of taxes, the establishment and observance of labor laws, etc. Depending on the level of intensity of interaction of the economic system with other systems and the number of such actors, one can identify several typical situations:

1. *An autonomous economic system* can be considered almost in isolation from other systems when the intensity of interaction with other systems is negligible. This term corresponds, with certain reservations, to the concept of isolated system.

2. *A dominant economic system* can be viewed as such in cases where its level of impact on other systems significantly exceeds the capabilities of the latter to influence it.

3. *A dependent economic system* can be viewed as such in cases where its level of impact on other systems is significantly inferior to the possibilities of the impact of the latter.

Besides, the so-called *macrosystems* are an important element of the proposed classification, representing the totality of individual economic systems, distinguished by the nature of the interaction. A degenerate case of a macrosystem is an autonomous economic system when the number of interacting systems is equal to unity. If two economic systems stand out at a given level of intensity and the nature of the interaction, then such a macrosystem will be *binary*. Continuing to consider the ever-expanding number of possible members of the macrosystem, we show that any macrosystem is characterized, first of all, by the number of specific systems included in it (which we will also call elements or entities of the macrosystem, as well as economic agents) at a given level and type of interaction.

We propose to understand the *probabilities of the systems' failure to achieve their goals* relative to other systems (macrosystem elements) as risks arising from the interaction of economic systems, considering the failure to achieve their own goals and the related consequences. In this study, we examined the totality of government bodies and business structures¹⁶. The government bodies, each of which can be considered as a separate system, characterized by its own set of regulatory attributes and goals of an

¹⁶ A. A. Ermakov, "Voprosy vzaimodeistviya vlastnykh i predprinimatelskikh struktur v sovremennoi Rossii", *Finansovyi biznes*, num 2 (2011) y V. I. Gaiduk & A. A. Ermakov, "Problemy vzaimodeistviya malogo i srednego biznesa i vlastei", *Colloquium-journal*, num 6 Vol: 10 (30) (2019): 34-35.

economic nature relative to its activities and the activities of other government bodies, the business environment, and its representatives, households and society as a whole, include:

- federal and regional government bodies;
- local government.

Entrepreneurial structures, depending on their economic indicators and legal status, include:

- large business;
- medium enterprises (medium business);
- small enterprises (small business);
- individual entrepreneurs.

The activities of each of these structures have their risks. We have shown that a complete set of all risks of each element of the economic macrosystem can be represented as a set of risks arising from the interaction of this element with other elements of the economic system, and its risks. Risks arise from many factors. The work¹⁷ reflects risk factors characteristic of the entire economic macro-system, including external ones. Besides, it identifies factors that are characteristic only for binary interaction and internal factors of interaction between elements of the economic macrosystem. If all factors are present in the system at the same time, the model of the risk system of the economic macro-system considering these factors can be represented as a system of corresponding dependencies. For example, for conditions of external crises, such as the current global financial and economic crisis, internal risk factors can be excluded from this system and only external risk factors can be taken into account.

In the study, the achievement of goals is viewed as a measure of the effectiveness of the entire economic macrosystem, each of its elements and the results of the interaction between them. Since economic systems can be very large, containing a significant number of elements that also have different target settings; such systems can have many goals. The achievement of any goal is associated with the implementation of the corresponding event. One should evaluate the events that mean *the achievement of own goals* by each element of the economic macro-system, as well as the events that mean *the achievement of the goals of the interaction* between the two elements of the economic macro-system. In the general case, these events are different, which negatively affects the activity and interaction between system elements. Moreover, for the binary case when the interaction between two elements (subjects) of the economic system is considered, we review various combinations of the results of their activities, and also, considering the fact that risk as a measure of failure to achieve a goal is associated with the probability of achieving the goal, we need to study the risks of failure to achieve goals of the economic system subjects and the interaction between them.

¹⁷ V. I. Gaiduk; A. A. Ermakov; S. A. Kalitko & S. V. Gladkii, "Predprinimatelskie riski v agrarnom biznese i ikh funktsii", Vestnik Altaiskoi akademii ekonomiki i prava, Vol: 5 num 1 (2019): 35-39.

As the authors of the model, we considered many goals that confront the economic macro-system and its actors. A graphical representation of the set of goals in the model is shown in Figure 1. It is proposed to represent each of the goals in the form of a plane having an individual coordinate system that reflects the costs (resources) Z_s that can be allocated to achieve this goal and the results (effects) E_s that can be obtained as a result of achieving this goal. A complete set of models of individual goals will be a comprehensive model of the whole range of goals that confront the economic macro-system and its actors.

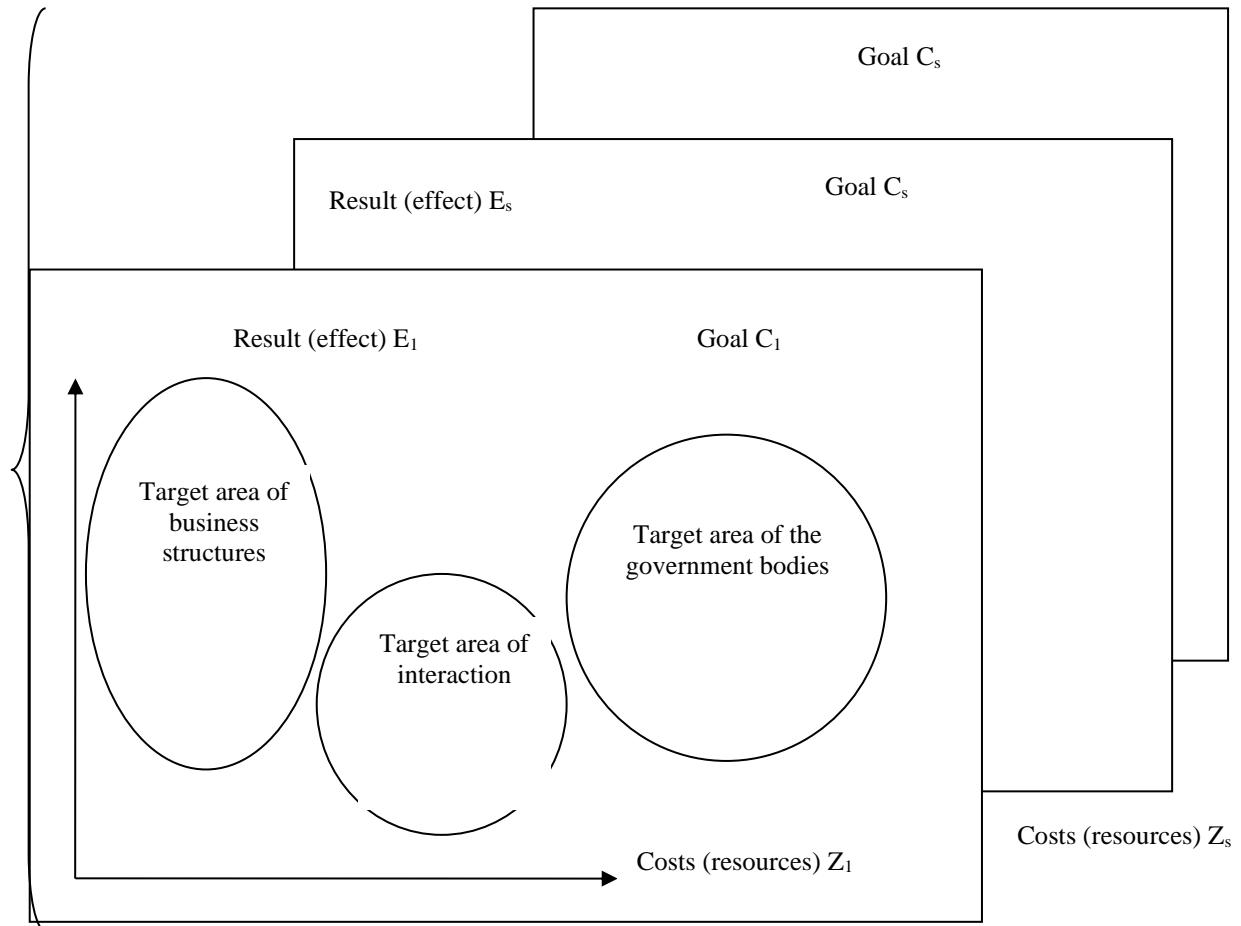


Figure 1

A comprehensive model of the goals of interaction between the government bodies and business structures within the economic macrosystem

The integrated model contains target areas in the form of figures reflecting for individual subjects and the results of their interaction, which they strive to achieve. It is assumed that *the goal of interaction between government bodies and business structures as economically active agents is to ensure certain interests of society, i.e. macrosystems.* Figure 1 shows the case of two entities (government bodies and business structures), as well as their interaction. The analysis shows that even for the case of only two interacting entities, there can be many options for combining their goals. Each of these options is characterized by its risks. We have investigated situations arising from this, including the following:

1. The target areas of the subjects and the target area of their interaction do not coincide.

2. The target areas of the subjects and the target area of their interaction are completely the same.

3. The target areas of the government bodies and the business structures coincide, but the target areas of their interaction do not.

4. The target areas of business structures and society coincide, but not with the target area of government bodies.

5. The target areas of the government bodies and society coincide, but not with the target area of business structures.

An analysis of the developed model let us establish a generalized risk of interaction within the framework of the economic macrosystem:

- the risk associated with the mismatch of the goals of the subjects and the macrosystem;
- the risk of not reaching their target areas by interacting entities;
- the risk of not reaching the joint target area (the interaction target area) by interacting entities.

In the “government – business – households” macrosystem it is established that *the risk of joint failure to achieve goals* is equal to the difference between the probability of an unavoidable event (which is 1) and the probability of joint achievement of goals by all participants: the government, business, and households (which equals the product of these probabilities).

We noted *the problem of harmonizing the goals of economic macro-system entities*. Within the framework of the developed methodological approach, the *harmonization of the goals of the economic macro-system entities* means the search and implementation of such solutions in which the own risks and the risks of the macro-system together will not exceed acceptable values. If such a solution is possible, *then, in this case, the harmonization of the goals of the macrosystem and its entities is ensured*.

We also propose to evaluate the results of the interaction between government bodies and business structures in the AS if there is an appropriate set of indicators in a measurable form. With this approach, *risks as a measure of insufficient effectiveness of interaction between government and business structures* can be divided into the following classes:

- risks of unsuitable interaction;
- risks of non-optimal interaction.

The risk of unsuitable interaction on a separate property of a subject is the probability that the interaction property of a given pair of subjects will not belong to the region of minimally necessary (permissible) results. The risk of unsuitable interaction in all properties is the probability that all interaction properties of a given pair of subjects will not belong to the region of necessary (permissible) results.

The risk of non-optimal interaction by a particular property is the probability that the interaction property of a given pair of subjects will not be optimal. The risk of non-optimal interaction for all properties is the probability that all interaction properties of a given pair of subjects will not be optimal.

We propose to divide all the main properties of the interaction into three main groups, characterizing:

- the interaction effectiveness, which reflects the target effect arising from the interaction of subjects of the economic system;
- the interaction resource intensity, which reflects the consumption of resources of all types necessary to obtain the target effect;
- the interaction efficiency, which reflects the use of time required to obtain the target effect.

Together, these properties characterize the effectiveness of interaction between subjects and reflect the quality of the economic macro-system as a whole. We review situations where the use of certain groups of interaction properties is possible.

For economic evaluation of the effectiveness of risk management following each event (the outcome of interaction), the result is measured in monetary units. Moreover, the financial results of interaction within the entire system are evaluated as the set of financial results of risk management for each subject of the economic system.

Assessing the effectiveness of managing the economic system by the subjects of the interaction system allowed us to determine the full group of scenarios of all possible cases of interaction between two entities (government bodies and the business sphere) in terms of interaction risk management:

- cooperation or symbiosis, when the interaction risk management is effective for both entities as both parties made a profit;
- commensalism, when managing interaction risks is effective for one of the interacting entities, as it made a profit, but the other entity is indifferent in this situation;
- conflict or commensalism, when managing interaction risks is effective for one of the interacting entities, as it made a profit, and for the other entity the situation is unsatisfactory because it received losses;
- disinterested discrimination or amensalism, when managing interaction risks is ineffective for one of the interacting entities, as it received losses, and for the other entity, the situation is indifferent because it had zero risks;
- mutual oppression (or competition), when managing interaction risks is ineffective for both interacting entities as their “cooperation” led to losses for both parties;
- indifference (or neutralism), when both entities are indifferent to interaction risk management due to the absence of risks.

We conducted a study of interaction risks within the framework of the developed approach with individual results of economic theory. In particular, the connection with the game theory is indicated. We noted the areas of intersection of the developed approach and the general equilibrium models and the relationship of the results with the main theory. In connection with the noted results, based on the conclusions of the main theory, it was proved that it is permissible to consider *interaction risks as a measure of deviation from optimal solutions that correspond to current and short-term conditions for the activities of entities and the economic system as a whole.*

One of the main forms of interaction between government bodies and business structures in the AS is public-private partnership (PPP)¹⁸. Moreover, one of its most important immanent properties is the distribution of risks between public and private partners. We formulated the following problem: *to achieve the set goal in the framework of PPP, it is necessary to choose a form and mechanism for the implementation of this project, in which risks between partners are distributed fairly and efficiently*¹⁹. Based on the general principles of PPP noted in the study, it is proposed to understand the *fair distribution of risks between the parties to PPP in such a way that risks are proportional to the level of contribution of each party to the project, considering the objective possibilities for their management.* Based on the concept of acceptable risk²⁰, the *effective distribution of risks between PPP parties means their distribution in which the risks of each side do not exceed acceptable levels when an acceptable level of the target effect of the PPP project is achieved.* Dependencies were developed to quantify the conditions for equitable distribution of risks and conditions for the effective distribution of risks²⁵.

It is proposed to use the *mechanisms of proportional or disproportionate risk sharing* as a methodological basis for the distribution of risks between participants in a PPP project. Therefore, since PPP is associated with many risks of a different nature and a particular risk can be managed most efficiently by one partner or another or together, the risk management of a PPP project will contain both proportional risk-sharing mechanisms and disproportionate ones. Figure 2 shows a block diagram of an algorithm for the distribution of risks between PPP participants.

Managing the distribution of risks consists in determining the amount of risks (losses) agreed upon and justified by the parties to the PPP that they can assume for each risk at each stage of the PPP project and the entire project as a whole. The need for such a detailed consideration is connected with the fact that when forming a specific structure for the distribution of risks, it is necessary to take into account the fact that for PPP participants they vary significantly and that they also vary depending on the stage (stage) of the PPP project.

¹⁸ A. A. Ermakov, "Gosudarstvenno-chastnoe partnerstvo kak osnovnaya forma vzaimodeistviya vlastnykh i predprinimatelskikh struktur, Strakhovoe delo, num 6 (2012).

¹⁹ A. A. Ermakov, "Snizhenie finansovykh riskov pri GChP", Strakhovoe delo, num 3 (2012) y V. I. Gaiduk & A. A. Ermakov, "Riski GChP v agrarnom biznese", Colloquium-journal, Vol: 4 num 4 (2019): 34-36.

²⁰ B. N. Porfirev, "Kontseptsiya riska, kotoryi nikogda ne raven nulyu", Energiya, num 8 (1989) y M. N. Dudin; E. E. Frolova; N. A. Lubenets; V. D. Sekerin; S. V. Bank & A. E. Gorohova, "Methodology of analysis and assessment of risks of the operation and development of industrial enterprises", Quality - Access to Success, num 17 Vol: 153 (2016): 53-59.

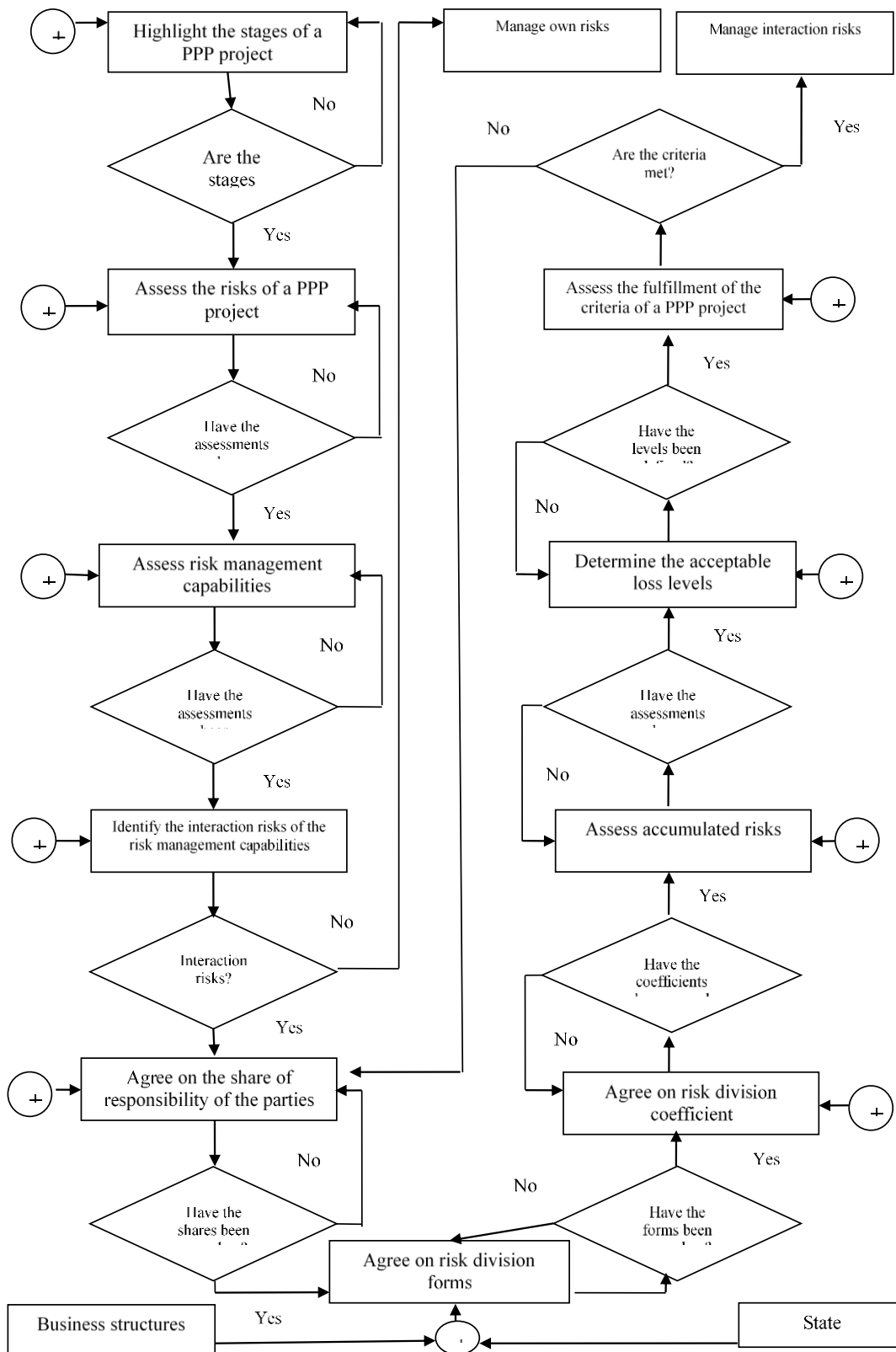


Figure 2

Block diagram of the algorithm for the distribution of risks between participants in PPPs in the AS

When forming a PPP project, it is recommended to develop and coordinate the so-called risk allocation matrix. We developed a procedure for filling such a matrix and described the content of the work performed in this case, as well as the corresponding algorithm for the proposed distribution of risks between PPP participants²¹.

Based on the fact that the distribution of risks between participants in PPP projects is essentially sequential, determined primarily by the presence of many stages of projects. As a rule, they are carried out sequentially, with many risks related to a particular stage, as well as many participants in PPP projects. As a computational basis for obtaining quantitative results according to the proposed algorithm, it is recommended to choose *dynamic programming*. This mathematical method is a powerful tool for optimizing sequential decision-making processes.

We analyzed the possibilities of practical management of the main risks of interaction between government bodies and business structures in the AS. As the analyzed risks, we chose political and financial risks with PPP.

As a result of the research, a basic approach to modeling an adequate state policy in the field of PPP and reducing political risks for PPP participants was proposed, tools for financial support and related risks were identified, and proposals for reducing financial risks for PPP participants were developed²².

Conclusions

1. The analysis of scientific works revealed the urgent need to improve theoretical research and practical recommendations to improve the interaction of government bodies and business structures in the AS.

2. The scientific basis for creating a model of the system of risks arising from the interaction of government bodies and business structures is justified.

3. We have determined the main goals of government bodies and business structures in the AS, as well as the forms of their interaction. We propose to understand the probabilities of the systems' failure to achieve their goals relative to other systems (macrosystem elements) as risks arising from the interaction of economic systems, considering the failure to achieve their own goals and the related consequences.

4. A model of the system of risks arising from the interaction of government bodies and business structures has been developed, including:

- the procedure for creating a generalized matrix of risks for the government bodies and business entities;

- the procedure for the formation of a complete set of risks of the subject of the economic system;

²¹ S. I. Dolgov; Y. A. Savinov; E. V. Taranovskaya; V. D. Sekerin & A. E. Gorokhova, "Developing the exports of russian goods and services through online stores", International Journal of Innovative Technology and Exploring Engineering Vol: 8 num 5 (2019): 981-986

²² A. A. Ermakov, "Snizhenie finansovykh riskov pri GChP", Strakhovoe delo, num 3 (2012).

- a way of considering risk factors common to the entire system and characteristic of the interaction of two specific entities of the economic system;

- a description of the risk system model of the economic macro-system considering risk factors and its modification for the case of a general crisis.

To refine the model, an approach has been developed that considers interaction risks as a measure of deviation from goals. At the same time:

- a group of scenarios of the results of two subjects of the economic system and their interaction was formed;

- we formed a group of risks of two entities of the economic system and their interaction;

- we developed a graphic representation of the model, including a model of an individual goal, as well as a comprehensive model of the whole range of goals that the economic macro-system and its subjects face;

- we have investigated various situations of combining the goals of the government bodies, entrepreneurial structures and the goals of interaction, which are understood as the interests of society.

5. We have provided an assessment of the risk of joint failure to achieve goals for the “government – business – households” macrosystem.

6. We have developed proposals on understanding the problem of harmonizing the goals of the subjects of the economic macro-system, and relationships describing this problem.

7. We have investigated the situations where it is possible to use the properties of interaction risks to describe one or another economic system. We have assessed the effectiveness of managing the entity's economic system's risks, for which we have calculated the necessary ratios. Based on the latter, we have also assessed the effectiveness of managing interaction risks between the subjects of the economic system.

8. We have developed proposals for the further development of the model and its adaptation to specific conditions. For this purpose, we propose to:

- determine the relationship between the pairwise interaction risks from the essential relations between every two elements of the economic macro-system, based on the game theory;

- outline ways to integrate the developed model with known computable general equilibrium models (CGE-models);

- use the main theory as the theoretical basis for the transition to optimization models of the economy, that is, the possibility of transition from the concept of achieving goals by economic agents used in our model to the optimization of their current activities is indicated, which allows the use of a widely developed apparatus of optimization economic and mathematical methods.

9. We have substantiated that to achieve the set goal in the framework of PPP, it is necessary to choose a form and mechanism for the implementation of this project, in which risks between partners are distributed fairly and efficiently. As part of the task, we have clarified the terms “equitable distribution of risks” and “effective distribution of risks”. We have developed formalized descriptions of the conditions for a fair and effective distribution of risks among PPP participants, as well as, as a special case of the latter, the optimal distribution of risks between PPP participants. We have proposed the mechanisms of risk distribution between PPP participants are proposed.

Besides, we have proposed that risk distribution management should be considered as agreed and justified by the parties to the PPP definition of the number of risks (losses) that they can assume for each risk at each stage of the PPP project and the entire project as a whole. We have developed the form of the matrix of risk distribution, the procedure for filling it out and the content of related works, and a block diagram of this algorithm. As a computational basis for obtaining quantitative results according to the proposed algorithm, it is recommended to choose dynamic programming.

10. We have carried out an analysis of the ability to manage the main interaction risks between government bodies and business structures. As the analyzed risks, we chose political and financial risks with PPP.

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