

Risk-Oriented Internal Control: the Essence, Management Methods at Small Enterprises

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ABSTRACT

The research topic relevance is inspired by necessity to develop theoretical and methodical provisions on the internal control system, risk-based management at small enterprises and to prove application feasibility, using economic-mathematical methods its implementation. The purpose of this research is to develop theoretical and methodical approaches to internal control system formation in small businesses, generating reliable and relevant information on the commercial organization activities, enabling risks identification. The leading approach to study this problem is situational and systematic in the frame of theory and methodology internal control at small businesses in the risk-based management system, allowing to analyze the impact of various risks on small enterprises activity and to systematize obtained results. According to the study results, there were proved the implementing internal control feasibility at small businesses, presenting the author's systematization and classification of internal and external risks in small companies, identifying organizational and methodological approaches to risk-based internal control development; implemented the adaptation of existing economic-mathematical methods within risk-based internal control at small businesses. The article can be useful for practical and scientific workers in the field of company's internal control, teachers, postgraduates, undergraduates and students, studying Economics and Management at higher educational institutions.

KEYWORDS

Small Businesses; Risk-based Internal Control;
Internal Control System; Economic-mathematical
Methods

ARTICLE HISTORY

Received 11 May 2016
Revised 27 June 2016
Accepted 30 June 2016

Introduction

One of the most important directions in the Russian Federation state policy at the present stage of economic development is to support and develop small

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businesses, increase their numbers, to promote innovativeness and competitiveness at these commercial organizations not only in domestic but also in foreign market. Russian economy development depends on the degree of potential implementation at small enterprises, strengthening its positions in the international arena.

Small businesses are not only a source of economic growth, creating competitive environment, but also an initiator in new products and technologies development, that increases the level of employment. Moreover, small businesses are highly vulnerable to various risks. Prerequisites for this risks emergence in small enterprises activities are, on the one hand, the peculiarities of their internal business environment (lack of resource base, weak human resources, low market reputation, etc.), and, on the other hand, external business environment (legislative base imperfection, concerning small enterprises, high tax rates, bureaucracy, corruption, large enterprises monopoly, etc.).

Small enterprises weaknesses, the external business environment turbulence require the creation of an internal control system that could be capable in effectively monitoring, risks analyzing and troubleshooting, be ministerial to their minimization and elimination. This goal could be achieved within the organization, conducting risk-based internal control as one of the business processes in a small business, which checks the generated complete and accurate information for management decision-making.

The content and organization of internal control in small businesses was studied by many researchers, including Russian (Gluschenko & Gluschenko, 2011; Suits, 2014, 2015; Hechanova, 2010; etc.). Paying tribute to great scientists' contribution to solve complex problems, it should be noted that many issues were examined without their respond to emerging risks. The setting and implementation features in risk-based internal control at small enterprises today are insufficiently developed, and many questions are debatable.

Risk-oriented internal control arrangement is seen through implementing systematic and situational approaches. A systematic approach implies the allocation of hierarchical levels, subsystems, and internal control elements. Situational approach takes into account the interaction of a commercial organization with the external business environment and involves the linking methods and techniques at internal control, depending on the emerging situations influence on small enterprise activity.

Approaches to risk-based internal control in small businesses involves a building process of the control elements, including control environment, information and communication, risk assessment, control procedures, control systems assessment to ensure effective risk management arising from the internal and external business environment.

To achieve this goal the following tasks should be solved:

- to justify theoretically the role and place of risk-based internal control in subjects' activity of small entrepreneurship in the Russian Federation;
- to determine organizational and methodological approaches to the formation of risk-oriented internal control;
- to adapt the economic-mathematical methods use in the frame of risk-based internal control in small businesses.

The research subject is a set of theoretical, methodological and practical aspects for risk-based internal control in small businesses.

The object of the study is the internal control forming at small businesses in Samara region, in the Russian Federation.

Having analyzed the scientific researchers' works, including Russian, it could be concluded that some questions haven't solved yet: the risks impact, which is characteristic for subjects' activity at small businesses in the content and composition elements that the internal control system and mathematical methods adaptation have, to require the internal control at small enterprises, aimed at managing and minimizing risks.

The study significance lies in theoretical aspects development the role and place of risk-based internal control at small enterprises (according to the Russian Federation), organizational and methodical approaches development to the risk-oriented internal monitoring formation and mathematical methods adaptation to it.

The present study has the following structure: abstract, keywords, introduction, research methods description, the study results (consists of three subsections), discussion, conclusions, list of sources, visual material.

Materials and Methods

Research methods

The following methods were used during the research: theoretical (dialectical logic, rational cognition, etc.); diagnostic (the status and causes diagnostic analysis, surveys and testing); experiential (facts description, measurement and the study results generalization, making groups, selection); experimental (configurations, models, methods development etc.); economic-mathematical methods.

The experimental research base

The experimental research is based on small business subjects in the Samara region of the Russian Federation.

The research stages

The problem was carried out in four stages:

- the first stage is the collection and Federal service data processing of Russia state statistics on the small businesses activities and small businesses surveys in Samara region on the role and place of the internal control system;
- the second stage - the study of the internal control system to identify its role and place in small companies risk-oriented management;
- the third stage –organizational-methodical approaches development to the risk-oriented internal control formation of the small entrepreneurship subject;
- The fourth stage - to implement and adopt the economic-mathematical methods of application in the framework of risk-based internal control at small businesses.

Results

Theoretical justification of the role and place in risk-based internal control at small entrepreneurship subjects activity in the Russian Federation

The small businesses significant difference is that they are more exposed to risks, because of their operating in aggressively competitive external business environment. Small enterprises social purpose is to enable people with work placement, to promote entrepreneurship in society, to develop entrepreneurial culture. Besides, there are certain advantages for small enterprises functioning in the economy as flexible strategy, mobility in organizational, production and other processes, the ability to adapt very quickly, refocusing internal processes, innovation and new products and technologies development.

According to the Federal service of Russia state statistics dated 31 December 2014; small enterprises activity indicators are presented in Table 1.

Table 1. Small businesses statistics in the Russian Federation in 2014

No	Indicator	Value*
1.	The number of small enterprises, including micro enterprises, thousand units	2 103,8
2.	Average number of employees (without external part-time workers) employed in small enterprises including micro enterprises (thousand people)	10 789,5
3.	The average monthly accrued wages of small enterprises employees, including microenterprises	280,95
4.	The turnover of small businesses, including microenterprises, € billion	386,17
5.	Investments in fixed capital of small enterprises, including microenterprises, € billion	9,72
6.	Non-current assets of small enterprises, including microenterprises, € billion	329,28
7.	Current assets of small enterprises, including microenterprises, € billion	639,88
8.	The capital and reserves of small enterprises, including microenterprises, € billion	276,41

Source: Compiled on the basis of the statistical digest «Small and medium entrepreneurship in Russia», 2015.

Small businesses, as any other economic entity, need to have internal control system (ICS). The risk-oriented internal control is considered as the business process implemented by management or other management personnel to ensure risks minimization in the fulfilling mission process to achieve operational and strategic goals. To determine the role and place of the internal control system, during the research, there was conducted a survey of 255 small businesses representatives in Samara region. The results of the survey are presented in Table 2.

Table 2. The results of a small businesses survey in Samara region

Question	Value, %
1. Does your company's internal control system (ICS)?	
a) Yes	65
б) No	35
2. If your company has ICS, how old is it fully functional?	

a) Less than 1 year	20
б) 1-3 years	45
в) 3-5 years	23
г) More than 5 years	12
<hr/>	
3. If your companies have ICS, have a standard for ICS or the internal control policy been developed?	
a) Yes	7
б) No	93
<hr/>	
4. If your company has no standard for ICS, is there a necessity for its development?	
a) Yes	39
б) No	61
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5. If your company does not have ICS, do you apply a separate test procedure?	
a) Yes	38
б) No	62
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6. If your company does not have ICS and do not apply a separate test procedure, is it reasonable to implement this system?	
a) Yes	84
б) No	16

Source: The small businesses survey of Samara region, 2015.

Among most of the surveyed companies, the head is responsible for organization and implementation of the ICS. The ICS assessment is carried in only 14% of companies (35 small enterprises). During the ICS assessment the commercial institution employees are given a questionnaire to evaluate the quality, efficiency and effectiveness of the internal control system functioning. Either the chief accountant (48%) or Deputy Director (26%) is responsible for the evaluation. Personal respondent's assessment of the ICS implementation at small business in most cases was positive (94%). Among the individual control procedures applied in the case of an internal control system absence at a small company, representatives of the entities noted the following:

- inventory;
- checking up of mutual settlements with counterparties;
- built-in computer program control procedures;
- employees' duties segregation, etc.

In case of agreement with the appropriateness of the internal control system formation in a small business the respondents should have to determine the future actions of the economic entity to ICS. The same was asked to do in that case, if the representatives of small business organizations agree with the necessity of establishing a standard for the internal control system.

Thus, despite the Russian legislation requirements to the internal control building, many small businesses in practice not implemented this legislation. This is mainly due to the incompetence of the leadership, the possession of information about the nature and advantages of the internal control system and infantilism, dealing with internal problems and external threats. Risk-oriented internal control system (RO ICS) involves the risk factor typical to both internal and external business environment.

A study of the small entrepreneurship subjects activity in Russia on the basis of the provisions approved by the Committee of Sponsoring Organizations

of the Treadway Commission (COSO), allowed to systematize the risks that affect their activities. It is well known that all the risks can be divided into the following groups – risks arising from the functioning of the external business environment and risks arising from the functioning of the internal business environment. In the framework of the studies, they were developed by the subgroups for each of these risk groups (Tables 3, 4).

Table 3. External risks, affecting on small businesses operations

Risk category	Risk name
1. Market risks	<ul style="list-style-type: none"> A. Changes in the global economy B. Fluctuations of the market infrastructure C. Changes in interest rate D. A ban on the goods import or export of a certain category E. Changes in exchange rates
2. Risks associated with the actions of competitors	<ul style="list-style-type: none"> A. Decrease in competitors' prices B. Strengthen the competitors' position C. Competition with goods that are substitutes D. The emergence of new competitors (domestic or foreign) E. Collusion of competitors in the market
3. Geopolitical risks	<ul style="list-style-type: none"> A. The risk of weakening the state sovereignty B. The risk of state collapse C. The risk of foreign intervention
4. Risks from suppliers, establishing discriminatory conditions	<ul style="list-style-type: none"> A. The financial instability of suppliers B. The breach of contractual obligations C. Price risk D. Poor quality of products supplied E. Dependence on key suppliers F. Setting discriminatory conditions for small businesses
5. Risks caused by changes in the legislation, including tax	<ul style="list-style-type: none"> A. Changes in the administrative legislation B. Changes in tax legislation C. Changes in legislation in the field of accounting D. Changes in labor law
6. Risks depending on changes in society and popular culture	<ul style="list-style-type: none"> A. Lack of employees' motivation B. Lack of qualified workers C. Low productivity
7. Environmental risks	<ul style="list-style-type: none"> A. The increase in the level of environment contamination B. The growth of harm compensation liabilities caused to the environment

Source: compiled by the authors

Table 4. Internal risks affecting the small businesses operations

Risk category	Risk name
1. Operational risks	A. Untimely defects identification B. Defective products dispatch to buyers C. Sub-optimal production planning D. Prolonged downtime E. Increased consumption of raw materials F. Noncompliance with the production plan
2. Labour risks	A. Insufficient staff number B. High turnover C. Failure to fulfill the obligations on wages payment to an employee D. Personnel documents registration, breaking down the legislation requirements
3. Commercial risks	A. Breaking down products delivery terms B. Cargo loss or damage during the transportation C. An increase in the number of product refunds D. A monopoly buyer existence E. Noncompliance with contractual obligations by customers, F. Unclaimed materials, raw materials formation G. Demand contraction
4. Other operating risks	A. Products conformity with the market requirements B. Lagging behind competitors C. The growth of unforeseen expenses D. Liquidity E. Cash gap F. An increase in the tax burden
5. Risks associated with the operation of the accounting, analytical support and control system	A. Errors in the documents design for contractors B. Exceeding budget targets C. Untimely or incomplete facts registration of economic life D. The occurrence of overdue accounts receivable E. Incorrect facts account of economic life F. The budget failure G. The financial statements unreliability
6. Risks of low efficiency of staff	A. Lack of employees' motivation B. Lack of qualified workers C. Low productivity
7. Risks of low efficiency in the organizational structure	A. The frequent changes in the organizational structure B. Inefficient decision-making system

Source: compiled by the authors

The proposed subgroups for the groups of external and internal risks, that characterize the individual risk category, and contain the list of risks, cannot be considered closed. Depending on different factors the number can increase or decrease.

RO ICS construction aims to identify and timely respond to the risks caused by the influence of internal and external business environment, leading to minimizing the negative consequences from risk occurrence and the benefits realization for small businesses, which represents a scientific and practical offer. In the framework of internal control the implemented procedures are focused at identifying risks and timely response, overcoming and minimizing their negative effects on the small businesses economic activity.

Thus, the place and role of internal controls in the company activities and the significantly benefits from its implementation allow not only to achieve the set objectives, but also unlock potential economic entity.

The immediate step to build the RO ICS organizational model is the implementation of the requirements of the system and situational approaches. This research direction is devoted to the following section of the article.

Organizational-methodical approaches to the risk-oriented internal control formation at a small business entity

The author's vision of the RO ICS organizational model is based on system and situational approaches. A systematic approach involves the allocation in a single system hierarchical levels, subsystems, and elements of internal control. RO ICS should be considered as a set of elements that are in tied relationship with each other, forming certain integrity.

The author's vision of the “hierarchical level” concept is that this category consists of an elements set that are in the same relationships and connections with the root of the classification tree. The hierarchical levels existence can be traced in the management structure of a small business, part of its organizational environment where the highest level is the company management, the average – line staff, lower – employees (performers). Goals and adopted solutions also have a certain hierarchy: strategic (long-term), tactical and operational (short-term).

The internal control system includes subsystems: The system of internal control includes subsystems:

- design risk-based internal control, reflecting its main purpose, the approach to its organization, the elements of the system, objects, and entities involved in internal control processes;
- internal control procedures aimed at solving the tasks set by the internal control system;
- risk maps development on the basis of risks classification, highlighting the internal and external risks characteristic to the economic entity activities;
- risk assessment, allowing to analyze the riskiness of small businesses in general and the established strategy implementation;
- optimal strategies selection, using mathematical methods;
- effectiveness assessment, which is measured using quantitative and qualitative indicators, and the internal control system effectiveness, defined as the ratio between the result achieved and the resources invested in the control procedures implementation.

The RO ICS creation for small businesses begins with the formation of its elements in accordance to the regulations approved by COSO as follows: control environment, information and communication, risk assessment, control procedures, the control system assessment.

Briefly the content includes:

1. Control environment. The control environment includes the organizational structure, the competence and professionalism of management and employees, personnel policy. In a small business it is characterized by the organizational structure of a hierarchical type, with allocation units. HR policy

provides for the expansion of functional responsibilities without changing the positions of the employees. Factors affecting the control environment are ethical values of management, staff competence, management style, power distribution. The control environment assessment in small business organizations involves evaluating the employees' actions in terms of achieving their tasks and their duties performance efficiency.

2. Information and communication. In modern conditions the small business entities use custom software for keeping records on personal computers. The creation of a single database requires providing employees with technical means. The generation process and information transformation should be put into practice, taking into account the selected information types. In particular, information gathering from the external business environment requires the specific approaches development and information gathering from internal sources can be strictly regulated. This is done through information provision either directly by the supervisor or internal supervisor.

The task to organize this element functioning is the establishment of relationships between RO ICS subsystems and information support in information technology. This element includes the system (operating system, telecommunications, management information and other service programs) and application management system (organization) of information security.

3. Risk assessment. Small businesses top-management often refuses this procedure, using an intuitive approach, making management decisions that could adversely affect the organization's activities. RO ICS allows making objects control more specific, namely: the facts of economic life, assets, liabilities, and sources of financing, revenues and expenses, as well as other objects. This allows identifying the areas of small enterprises activities, which should promptly identify risks that could threaten the preservation of the organization continuity. Risk assessment is carried out in accordance with the proposed classification of risks in the framework of business environment differentiation as internal and external. The list of risks within each sub-group is adjusted in accordance with the characteristics of the economic entity activities.

4. Control procedures that is assessed the objectives achievement, set by the management at a small enterprise, and on the established indicators achievement. In our view, the COSO recommendations for the control procedures application seem most appropriate and include the following: defining and communicating responsibility to staff; monitor physical and system access; the economic life facts authorization; a record of the economic life facts; supervision; policies documentation, procedures and responsibilities; training; duties segregation; assets availability control.

In the modern practice of small enterprises in the framework of RO ICS the "compliance control" procedure is successfully implemented. Compliance refers to a business principle that provides meeting requirements with legislation, standards, rules established by the public authorities, professional organizations and internal organizational-administrative documents. Consequently, the use of compliance control allows evaluating the enterprise activity with the purpose of monitoring the personnel compliance with internal and external standards and requirements.

5. Evaluation of the control system, which in a small business is advisable to carry out by identifying the efficiency and effectiveness of the system implementation.

Quantitative evaluation of the RO ICS impact is carried out by calculating the relationship multiplying potential damage from risks and the likelihood of its implementation before ICS introduction to multiplying the potential damage from risks and the likelihood of their implementation after the ICS introduction. Coefficient of performance refers to the interval $(0; +\infty)$. Depending on what interval inside the interval $(0; +\infty)$ belongs to the value of the performance coefficient, form a conclusion about the effectiveness of the RO ICS introduction at the enterprise.

The RO ICS effectiveness is determined by constructing the ICS implementation costs vector and the ICS contribution costs vector in the cost of goods, works and services of the company. Further, based on the linear dependence between the vectors there is the cost-effectiveness matrix construction. After vectors normalization by their projection on the coordinate axes, defined those enterprise divisions for which the introduction of RO ICS was the most effective.

In the process of creating the risk-based internal control organizational model there should be mentioned the stages order.

The first stage is the study of the organizational company structure.

The second stage is the identification and assessment of risks typical for the business.

The third stage - the control procedures definition and providing useful information.

The fourth stage – the control and analytical procedures implementation.

The fifth stage is monitoring the internal control effectiveness and making reports that contain efficiency and effectiveness indicators.

Situational approach in the risk-based internal control functioning is designed to determine the composition of specific methods and internal control techniques depending on the evolving situations in the small enterprises activities under the impact of the external business environment.

As for emerging risks, it is important to identify possible causes and consequences of their implementation, the criticality level for the company and select the required control procedures. So, relating to the risk associated with the actions of competitors "Competition with the goods-substitutes" possible reasons for the following acts: more attractive features of substitute products for buyers; an unknown enterprise production technology. Consequences are a loss of customers and, accordingly, lower revenues. Among the instruments of control the risk is advisable to apply methods aimed at the prevention of the risk, reducing the frequency of its occurrence and damage: monitoring the situation on the market, tracking competitors.

The risk associated with the suppliers' actions, establishing discriminatory conditions – "dependence on key suppliers", arises when a vendor sells unique products, work, services and offering more attractive terms only in the case of long-term cooperation. The consequences in this situation are dependent upon the conditions which are set by the supplier, failure in the sales plan implementation in the case of the supplier's negligent actions. To prevent the occurrence of this risk and minimize the consequences of its occurrence, it is necessary to apply procedures for the control and prevention: expanding the supplier base, monitoring the situation on the market.

Production risk related to the category of "internal" - "Increased raw materials" consumption, arises from unfair implementation of production workers their duties. As a result, there are additional costs for the enterprise, the production cost increases. In this situation it is necessary to apply methods such as limitation and procedures to prevent damage. The practice study of an organizational model, implemented risk-based internal control in Samara region, is elucidated factors, which limited its possibilities and could not allow achieving its goals (table 5).

Table 5. The factors limiting the possibilities of risk-based internal control

Factors	Feature factor and the consequences
Incorrectly set goals of the enterprise	The company is focused on ill-defined, unrealistic and unacceptable goals, making the system a risk-based internal control ineffective
External factors	Environmental factors have a significant impact on the organization, however, the system of risk-based control in no way can influence them
Mistaken judgment	System of risk-based control does not guarantee the accuracy of judgments made by employees at all levels and management, which can lead to negative consequences
The human factor	Any employee of the enterprise can make intentionally or negligently errors
Management negligence	Managers are able to neglect the internal control or due to the lack of professional discipline and ethics, or to conceal facts which may have an adverse impact on the organization activities. Both reasons can lead to the incorrect information formation, judgment errors and inefficient decision-making
Collusion	Employees' collusion with one another or with third parties are difficult to predict and difficult to identify, but its existence can jeopardize the functioning of the risk-oriented internal control

Source: compiled by the authors

Introduction to practice at small businesses in Samara region organizational-methodical approaches to risk-based internal control allows to generate information for making investment, financial, production, marketing and other management decisions and determine the future direction of monitoring, risk analysis and to respond to them.

The use of economic-mathematical methods in the framework of risk-based internal control in small businesses

The study showed that in a market economy, the profitability indicator of company economic efficiency allows giving a general assessment of its risk activities, and determining the existence of possible strategy implementation.

A measure of total risk (Re) activities a small business can be calculated with the formula:

$$Re = 1 - NP / (CC + SC + MC), (1)$$

where NP - net profit;

CC - cost of goods (cost composition of output);

SC - commercial expenses (selling costs);

MC - management costs.

The information base in this case is the statement of financial performance.

The ratio $NP / (CC + SC + MC)$ characterizes the share of the net profit to the sum of all expenses of the company. The difference between one and the calculated share shows the share of net profit in total amount of expenditures, which the company could obtain, but was not in the power of any negative changes in the external or internal enterprise environment. Interpretation of the calculated indicator is made depending on the interval to which it belongs:

- $(1 ; +\infty)$ - activities are in a high risk environment, its inefficiency can lead to bankruptcy and company liquidation;

- total risk is equal to 1 in the analyzed reporting period, so the enterprise has no net profit;

- $(0;1)$ - the closer the score is to 0, the less risky activities; the closer the score is to 1, the more negative consequences of the enterprise;

- $(-\infty; 0)$ - activity is carried out under conditions of minimal risk, poses no threat to the enterprise.

As discussed above, small companies are perceived to risks arising out of the external business environment functioning (market risks; risks associated with competition; risks associated with suppliers, establishing discriminatory conditions, etc.) and internal business environment (production, labor, commercial and other risks).

In this regard, small businesses often have to make a decision on the allocation of funds between investment objects that cause risks. The use of economic-mathematical methods in the internal control process risk assessment allows minimizing them to ensure the adoption of strategic decisions with regard to the influence of the external environment. One of the instructional techniques is the theory of games, which is characteristic for situational approach in the framework of internal control in the modeling process, various conditions (situations) and in the study of the changes occurring in internal and external business environment and causing risks of doing business.

Considering, how game theory was used in practice, internal control risk assessment, "Project" LLC making decision on the allocation of funds in the amount of 150 thousand €, when you select one of several strategies of business development. The company owners should make a strategic decision about the investments structure in the chocolate bars, honey and muesli production. Distribution options of target financing are presented in Table 6.

Table 6. Distribution options targeted funding for "Project" LLC production development, €

Product	Strategy 1	Strategy 2	Strategy 3
Chocolate bars	100 000,00	50000,00	40 000,00
Honey	25 000,00	70 000,00	60 000,00
Muesli	25 000,00	30 000,00	50 000,00
Total	150000,00	150 000,00	150 000,00

Source: data of the Project" LLC, 2016

As you know, it is impossible to act in the framework of the games theory not taken into the consideration the business environment conditions that is the

nature of the strategy. The nature considers the demand dynamics for the company's products. By managers' estimations, "Project" LLC demand dynamics for three distribution channels in 2016 compared to 2017, may have two options (table 7).

Table 7. Forecast demand for "Project" LLC products in 2016 by distribution channels in %

Distribution channel	Nature 1	Nature 2
Own retail network	7	27
Wholesale buyers	12	15
Online store	25	3

Source: the "Project" LLC data, 2016

To calculate the implementing result from each of the strategies in different business environment conditions (nature) we use the designations applied in the calculations:

A_i - the strategy version (the spending direction of the trust Fund);

N - nature state (demand) (N_1 - in 2017, N_2 in 2016);

i is the number of the option strategy;

j is the number of nature states (demand);

α is the smallest one of the calculated parameters;

β - the greatest of the calculated indicators;

r_{ij} is the risk of the player (small enterprise), chosen one of the strategies.

The elements calculation of the strategy and nature intersection occurs through the addition multiplying strategy type and appropriate natural conditions (figure 1).

From Figure 1 it is seen that the lower price of the game is $\alpha = \max A_i = 21, 30$, and the top net price of the game is $\beta = \min \beta_j = 22, 50$.

In this case, we can't simplify the computational table because there are no dominant strategies. In addition, game theory is inappropriate to ignore certain nature state, since it can implement some condition no matter it is beneficial to the player or not.

A_i	N_j	N_1 (7%, 12%, 25%)	N_2 (27%, 15%, 3%)	α
A1 (100, 25, 25), thousand€		16,25	31,50	16,25
A2 (50, 70, 30), thousand€		19,40	24,90	19,40
A3 (40, 60, 50), thousand€		22,50	21,30	21,30
β		22,50	31,50	-

Figure 1. The calculation of revenue growth from the proposed strategies implemented in different nature conditions

Source: compiled by the authors

Next, the obtained results are transformed into a risk matrix that allows identifying more precisely the advantage of one strategy compared with another in the various nature states. Risk r_{ij} of the player, if he uses the pure strategy A_1 , A_2 or A_3 in the nature state N_1 or N_2 , is called $r_{ij} = B_j - a_{ij} \geq 0$ (figure 2).

A_i	N_j	N_1 (7%, 12%, 25%)	N_2 (27%, 15%, 3%)	$\max r_{ij}$
A_1 (100, 25, 25), thousand €		6,25	0	6,25
A_2 (50, 70, 30), thousand €		3,10	6,60	6,60
A_3 (40, 60, 50), thousand €		0	10,20	10,20

Figure 2. Risk matrix strategies, "Project" LLC, 2016

Source: compiled by the authors

From Figure 2 it is seen that the least risky strategy is the first strategy, according to which the company is required to invest 100 thousand € for the chocolate figures production development and 25 thousand € for the honey and muesli production development. The second strategy is also valid, because risk deviation from the first is 6%. It is obvious that the third strategy is the most risky and probably unprofitable.

However, the search for optimal solutions should be specific to statistical games and appeal to a variety of criteria, each of which has a certain decision-making logic. In practice, Wald, Hurwitz, Laplace, Savage Tests are used, etc. We'll carry out the search of optimal solutions to choose the strategy for "Project" LLC on the criteria basis.

These criteria allow evaluating the decision from different positions, therefore, reducing the implemented risk from the enterprise activities.

Wald Test. The application of this criterion is based on the extreme pessimism and suggests that the player will have to act in the worst nature conditions. That is why; the optimal strategy is considered the maximin pure one. Therefore, the Maximin gain is regarded the lower game price $\alpha = 21, 30$. Therefore, according to Wald, is the optimal pure Strategy 1. **Hurwitz Test.** This criterion recommends operating in pessimism-optimism conditions and expecting something in between. Therefore, the optimal strategy is determined from the condition: $\max [y \cdot \min a_{ij} + (1+y) \cdot \max a_{ij}]$. Tweaking the solution is presented in Figure 3. The value y belongs to the interval $(0, 1)$ and is chosen from subjective considerations. Assume that the player will act rather on the basis of the minimum a_{ij} , therefore, $y = 0.8$ or greater. Thus, based on these data, we can conclude that the most optimal will be considered as Strategy 3.

Laplace Test. In accordance with this criterion, the player may not be aware of the possible nature states P . Optimal one will be considered clean strategy that provides the maximum net winnings of the player in the equality of all possible probabilities. The solver is presented in Figure 4. According to the Laplace Test application rules the best strategy would be considered Strategy 1.

N_j	N_1 (7%, 12%, 25%)	N_2 (27%, 15%, 3%)	$0,8 \times \min a_{ij}$	$0,2 \times \max a_{ij}$	the minimum and maximum sum
A_i					
A_1 (100, 25, 25), thousand €	16,25	31,50	13,00	6,30	19,30

A2 (50, 70, 30), thousand €	19,40	24,90	15,52	4,98	20,50
A3 (40, 60, 50), thousand €	22,50	21,30	17,04	4,50	21,54

Figure 3. The search for optimal strategies when applying Hurwitz Test
Source: compiled by the authors

Nj Ai	N1 (7%, 12%, 25%)	N2 (27%, 15%, 3%)	the Average win
A1 (100, 25, 25), thousand €	16,25	31,50	23,88
A2 (50, 70, 30), thousand €	19,40	24,90	22,15
A3 (40, 60, 50), thousand €	22,50	21,30	21,90

Figure 4. The calculation of the winnings from the applied strategies in accordance with the Laplace Test
Source: compiled by the authors

Savage Test. This criterion assumes that the player will operate in conditions of extreme pessimism and recommends choosing an optimal pure strategy, which minimizes the maximum risk. From Figure 2 it is seen that the least risky Strategy is 1 in which $r_{ij} = 6, 25$.

Thus, we can conclude that the best and less risky strategy is the first. Thus, the use of statistical criteria can reduce the risk of making wrong management decisions, directing funds to the strategy implementation, not taking into account the demand structure for manufactured products.

These analytical tools application is appropriate not only for funds investment direction on products types, but for the diversification analysis purposes on the territorial aspect of business development.

Discussions

Theoretical justification of the internal control role and place in general and in small businesses activities in particular have been devoted works of foreign and Russian scientists: T.R. Tyler (2006), C.F. Camerer (2003), M. Cheng, D. Dhaliwal & Y. Zhang (2013), T. Danescu, M. Prozan & R.D. Prozan (2015), D. Dhaliwal (2013), W.C. Mair (2015), H.A. Skaife, D. Veenman & D. Wangerin (2013), Y. Zhang (2013), V.P. Suits (2014, 2015). N. Hechanova (2010), E.P. Shcherbakov (2013) and others.

Researchers T.R. Tyler (2006) and C.F. Camerer (2003) considered internal control as an accounting procedure or system, which design is formed in such a way as to ensure efficiency and confidence in the fact that the company has taken all necessary measures to protect their assets and prevent fraud and error.

COSO treats internal control as a process implemented by management and other economic entity employees aimed at ensuring the achievement of

objectives, efficiency and operations effectiveness, performance reporting reliability and legislation compliance.

In the materials published by the World Bank, points to the special importance of internal control to ensure that company objectives are achieved. Thus, according to the World Bank, the most complete definition of the category "internal control" the Institute of Internal Auditors (Institute of internal auditors) – a process aimed at ensuring the reliability and integrity of information, compliance with legal requirements and internal policies, the assets safeguarding, economical and efficient resources use, goals and objectives achievement (Mair, 2002).

V.P. Suits (2014, 2015) defines internal control as a system which functions to diagnosis, prevent and timely respond to significant errors and distortions in processing different information types.

N.N. Hechanova (2010) and E.P. Shcherbakov (2013) make the concept of "internal control" that means the feedback function in the enterprise through which the user receives useful information about the actual company condition, the result and effect of management decisions.

T. Danescu (2015) noted that internal control in conjunction with the effective company management is a process aimed at ensuring long-term development, stability, rational resources use and enhancing trust to the company as a whole and to its leadership.

M. Cheng (2013) define internal control as a process, the purpose of which is to provide individuals, taking management decisions, high-quality and useful information, the effectiveness and reliability of financial statements.

H.A. Skaife, D. Veenman & D. Wangerin (2013) consider internal control as a set of procedures, tools and techniques aimed at ensuring the reporting transparency. Among the reasons to low efficiency, the most significant consider the assumption of error occurrence and other manipulations, including inappropriate and intentional, leading to a decrease in the quality in the actual and estimated values.

The nature study and internal control content have led to the conclusion that, despite its prominence in recent years, conceptual foundation is still not established and not determined by its place in the risk-oriented control system. This study proves the necessity and feasibility of internal control development, focusing on the organizational model of the risk-oriented structure in small enterprises management, which is not found proper attention from the scientific community even nowadays.

The problem of approach choice to the organizational internal control model occupies a significant place in the works of modern scientists. These issues were researched by: B. Andersen (1999), M.H. Mescon, M. Albert & F. Khedouri (1981), H. Fayol (2013), M. Weber (2005), L.F. Shilova (2010), K. Ward (1992), I.V. Alexeev (2012), O.S. Glinskaya (2015), O.E. Nikolaeva (2003), T.M. Sadykov (2004), etc.

We'll present an overview of researchers view on the approaches to the internal control construction in the company's activities. The study showed that there are the following common approaches – process, system, institutional, strategic, etc. Process approach. B. Andersen (1999) in "Business processes. The improvement tools in constructing systems at the enterprise prefer a process

approach, which involves the commercial organization division on business processes. This control is provided as part of the overall strategy at the economic entity. According to B. Andersen (1999) during the internal control organizing based on the process approach it is necessary to carry out the allocation of business processes and determination of their specificity for specific control in objects formulation. The process approach is used to interpret "the internal control concept" in the auditor activity № 8 Federal rule (standard): "to understand the entity, the environment in which it is carried out, and the risks assessment of material misstatement in the audited financial (accounting) statements". The standard specified that the internal control system is a process, organized and implemented by the company management and employees to provide reasonable assurance, that enterprise goals will be achieved, activities will be effective and efficient as reliable given accounting (financial) statements.

A systematic approach. M.S. Silvester (1973) considers the economic subject as an open, but complex system consisting of several elements, interconnected and contribute to its functioning. This way for understanding organization forms makes systematic approach that can be the basis for the internal control system. The use of this approach allows fully and comprehensively to recognize and to take into account the links and interactions between elements of the internal control system (control environment, information and communication, risk assessment, control procedures, monitoring), to use the techniques of system analysis and dialectics. In the framework of the internal control system built on the basis of the system approach, there are marked not only its elements, but the hierarchical levels and functional subsystems.

H. Mescon, M. Albert & F. Khedouri (1981) in their collaborative work highlights a systematic approach as dominant in the organizational structures creation in enterprise management. The introduction of this approach occurs through the linking of specific techniques, principles and concepts to specific situations occurring in the economic entity activities. The objective of establishing this relationship is to find the most appropriate and effective managerial decisions. In this case the construction of the internal control system is provided by monitoring external and internal environment.

A.A. Kuzmichev & N.F. Kolesnik (2008) consider internal control as a system of interrelated methods, tools and procedures, development and use by the company's management to minimize the risk of a business and financial activity and the risk of unreliable data recording and reporting.

H. Fayol (2013), P.S. Gorski et al., (2005) and D.M. Trubek (2005) developed the approach of management classical school, in which the company is considered as a social system, which leading elements is the behavioristic concept aimed to study the company human capital. When constructing the internal control system in the framework of this approach takes into account the interaction between the control functions, which according to the management classic theory approach include: forecasting, organizing, distribution, coordination and, of course, control.

Institutional approach. L.A. Chaykovskaya (2015), L.F. Shilova (2010) propose to use institutional approach in building up the commercial company system, which involves strict selection rules of formal and informal nature, subjects, objects and other elements, and defining the conditions of interaction

between them. One of the key principles in this approach, according to the authors, is the principle of justice in order to distinguish the institutional risks which will focus the functioning of the internal control system.

Strategic approach. K. Ward's (1992) works are devoted to strategic approach understanding to building-up systems in the economic entity. One of his major works – "Strategic management accounting" - specifies the use of the tools and methods of strategic accounting, analysis and control, special valuation techniques and adjustment strategies, forming internal systems. The strategic approach in the internal control system allows implementing the enterprise strategy, to achieve its objectives and to balance long term development.

It should be noted that in the works of Russian researchers (L.V. Alekseeva (2003, 2012), O.E. Nikolaev (2003)) provides suggestions to apply this approach, including the use of forecasting tools, financial flows, assess reliable and valid information flows, procedures and criteria-based characteristics of estimates etc. The International Standards for Supreme Audit Institutions (ISSAI), developed by the The International Organization of Supreme Audit Institutions (INTOSAI) (2004), their documents to private companies include the COSO model implementation at the enterprises and the internal control system decomposition on the following components: control environment, risk assessment, control procedures, information and communication, monitoring. Among the most appropriate internal control procedures, suggested to use of the following:

- 1) permission and approval of the management and employees' actions;
- 2) access control to resources and information about activities;
- 3) verification procedures;
- 4) figures reconciliation in the primary accounting documents, ledgers and reporting;
- 5) functions separation between employees;
- 6) assessment of operational effectiveness;
- 7) assessment of business processes and activities in general etc.

KPMG (1999) recommend carrying out the risks alignment typical for the activities of the enterprise, with appropriate quality control procedures. For example, in relation to the risk to lose key suppliers, it is advisable periodically to assess the key counterparty's effectiveness. In relation to the risk in failing e-Commerce implementing at the enterprise – you'd better implement procedures for long-term and short-term planning actions to accomplish the task. When there is the risk of political environment volatility, it is recommended to use monitoring tools – preparing monthly reports on the external environment of the enterprise, to analyze the news agencies data. L.A. Chaykovskaya (2007) examines internal control procedures through the prism of the need to ensure enterprise economic security. In this regard, according to the author, the most important is the complex security formation in terms to protect company assets, application of compliance procedures and techniques for modeling situations, such as the game theory use.

T.M. Sadykov (2004) examines the application of internal control procedures to ensure the reliability, validity and relevance of information;

efficient use of resources belonging to the enterprise; the methods of detecting fraud schemes in accounting, inventory, etc.

It should be noted that to date there is no final understanding in organizational-methodical approaches choice to risk based internal control and its purpose in managing the company. According to the study authors, one of the most rational approaches to the internal control system, in particular, for implementation at small businesses is a risk-based approach that upstream to manage risk, that are common in their activities and emerging in the internal and external business environment. As the risk factor always has a significant impact on the company's functioning processes, it is able to provoke the occurrence of other risks. The introduction of risk-based internal control minimizes the effect of negative consequences from risk occurrence. The risk-oriented internal control could generate information on the most important and risky areas of the company.

Proposed by authors, the study on the organizational and methodological approaches and risk-oriented internal control forming at the small entrepreneurship subject attests their timeliness and practical relevance, as they meet business requirements, contribute to choose strategies in terms of the business environment variability. Also original approaches and develop a complementary methodology of internal control presented in the works of other researchers and used in practical companies activities. In the context of specific management activities and small enterprises functioning among the many approaches proposed both by Russian and foreign authors, it is advisable to choose the one that will minimize the risks and realize the company potential to maximize the results of its operations. This proved in the study results and presented in this article.

The conducted study allowed concluding that the use of economic-methodical methods is widely demanded in modern science and practice. Criterion approach determining the most effective and promising solutions minimizes the managerial decision-making risk of low quality which can lead to negative consequences. There are widely demanded tests of Wald, Hurwitz, Laplace, and Savage in the framework of game theory that became one of the tools of economic and mathematical method. This is reflected in the works of both Russian and foreign scientists:

L.I. Zelenina (2015), J.V. Olar (2015) consider the application of these criteria within the managerial decision-making process in the context of the situational approach to the systems analysis and control formation.

V.V. Glushchenko (2011) and P.V. Glushchenko (2011) consider the use of multicriteria selection as a factor for reducing the risks likelihood in uncertain conditions, which allows to model and algorithmize the decision-making procedure.

The universality criteria of Wald, Hurwitz, Laplace and Savage allow their use in businesses of all industries. So, V.I. Loiko & N.I. Efanova (2004) in their research used these criteria to analyze the risks faced by agricultural enterprises and the development of optimal strategies for these companies. K. Pazek & C. Rozman (2009) propose the application of these criteria in the field of agriculture, since the development of scenarios allowing the decision makers to select one of a predetermined number of alternatives using information on the different company nature states.

V. Diaby & R. Goeree (2014) noted the usefulness of the multicriteria analysis system in choice-making for the health system. Criteria of Wald, Hurwitz, Laplace and Savage allow ensuring the completeness, structure and transparency of the decision-making process in conditions of instability both external and internal company environment.

There are important in this context the results of a study, made by H. Gasparis-Wieloch (2015), in which application of the criteria, when developing management decisions are treated as receiving in forecasting, allowing determining not only the best scenario (strategy) development activities, but also the possible negative situations that threaten the financial stability of the company.

The authors' study attempted to adapt the application of existing economic-mathematical methods in the framework of risk-based internal control in choosing the optimal strategies for small businesses, which is proof of the unlimited possibilities, using them in monitoring and differentiating the results obtained from the results in earlier Russian and foreign scientists surveys.

Conclusion

The results theoretical significance presented in the article is to reveal conceptual approaches to the study of the role and place in risk-based internal control activity at small entrepreneurship subjects of the Russian Federation.

To assess the extent to which implementation of the internal control system there are exposed the survey results of 255 small businesses representatives in Samara region. The study has systematic risks, influencing activity of small entrepreneurship subjects in Russia. The result was concluded that to minimize the negative consequences from risk occurrence and realization of the small businesses benefits, they need to create a system of risk-based internal control, the main purpose of which is to identify and timely respond to the risks caused by the influence of internal and external business environment.

The theoretical results of the study can be classified as a contribution to better research for development of risk-based internal controls.

The practical significance of the results is the definition of the organizational-methodical approaches to risk based internal control and adapts the application of economic-mathematical methods in the framework of risk-based internal control in small businesses.

Practical importance is the organizational and methodological model of risk-based internal control based on the system integration and situational approaches. The system approach involves the allocation in a single system hierarchical levels, subsystems, and elements, and situational - definition of the specific methods and internal control techniques depending on the evolving situations in the small enterprises activities, that is influenced by the effect of external and internal business environment. The theoretical results of the study can be classified as a contribution to better research for development of risk-based internal control.

The study presents adaptation of the game theory application and various criteria within the risk-oriented internal control assessment strategic decisions, e.g. choosing one of several strategies for business development.

The obtained results are intended to improve the quality and efficiency of taken decisions on risk management. The main provisions of the methodological nature can be used by practicing analysts and supervisors, managers and risk departments in company.

Recommendations

The main theoretical and practical results of the research can be applied in various business segments, primarily small businesses. They can also be used in research and higher education institutions for the further development of theory and methods of internal control the system in risk-based management, to develop internal control assessment to choose the strategy.

Disclosure statement

No potential conflict of interest was reported by the authors.

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