

DIAGNOSTIC MODEL OF MANAGEMENT RISK ANALYSIS

V.G. Pluzhnikov, *pluzhnikovvg@susu.ru*,

S.I. Kukhareenko, *kukharenkosi@susu.ru*,

S.A. Shikina, *shikinasa@susu.ru*

South Ural State University, Chelyabinsk, Russian Federation

Much attention in scientific and scientific-practical publications is given to the problem of risk management. However, the issues of theory and practice of constructing the company's risk management systems and policies remain insufficiently developed. Solving the problems of comparative assessment of the level of risks when choosing an investment policy for the implementation of the chosen strategy of the company's development is topical while ensuring the sustainability of the strategic development process. Assessment of management style and level of managerial risks is carried out on the basis of the economic-mathematical model of quantitative evaluation of qualitative parameters. The analysis is carried out by comparing the actual level of its investment activity with a reference value that takes into account the company's life-cycle phase (LCS). The commonly accepted classification of LCS stages and the method of quantitative evaluation of the integrated indicator of the company's investment activity are used in the work. A diagnostic model for analyzing the level of managerial risks in the implementation of the investment policy of the company's development strategy is proposed. The developed mathematical tool allows to diagnose the level of managerial risks, management style, and also the type of investment policy implemented by the company depending on the LCS stage of the company.

Keywords: managerial risks, behavioral model, natural level of investment activity, life cycle stage of company's.

Introduction

The world's and home practice show that stable and effective work of companies in constantly changing conditions of our outside environment with high level of uncertainty and risk can only be possible through effective management of process strategic development. This management is carried out in accordance with the strategic goals. These goals form the company's investment policy, which reflects the management style (behavior) of the company's management. For a proper study of the attitudes and mechanisms of the decision-making process, it is necessary to take into consideration subjective and psychological aspects of behavioural economics [2].

In modern conditions we feel the need to evaluate the strategic development level of a company in the process of forming its investment policy [12]. The choice of investment policy according to strategic objective of the company is closely connected with a stage of its lifecycle [14].

The process itself can be exercised in different variants: exposure of necessities in the course of reaching strategic aims of the company development, defining form and volume of investments, forming and managing the investment policy in accordance with development strategy, managing the development and accomplishment of investment project portfolio [1]. The investing activities shall provide achievement of long-term goals of the company and are performed according to developed investment policy [6].

Need for forming of investment policy and management according to the declared strategy of the company is obvious, it is caused by limitation of a number of scientific methods of its assessment and control. The management of the companies in practice relies on the accumulated experience and an intuition. How to promote the innovative activities is an important problem for modern society [8]. As a result we have a need for development of new approaches for formation of investment policy taking into account such important factor as management style.

Within this article we declare that we understand investment policy as a complex of actions for management of investment activity according to the formulated development strategy of the company. It is demands consideration of the following questions: the choice of strategy at various stages of development of the company; formation of investment policy and control of efficiency of its realization.

Research objectives and hypotheses

Comparing the actual level of investment activity (C_{ia}) with the natural level of investment activity (C_{nat}) we will defined which one of them reflects the type of implemented management. The Natural level of investment activity (C_{nat}) is determined by the strategic development plan of the company, depending on the stage of the life cycle (LCS).

1. Theoretical decisions

1.1. Forming of strategic objectives at various stages of lifecycle (LCS)

For the answer to questions of the first group it is necessary to consider that practice of management of development of the companies has a big variety of classifications of strategy. In order that in them their classification is necessary to be guided. Within this article the is applied following classification of reference strategy given in Table 1.

Classification of standard strategies

Table 1

Name of the strategy	Contents
1. Strategy of concentrated growth	Product alteration or changes in market
Strategy of strengthening positions on market	Taking the best positions with this product on the current market
Strategy of market development	The search for the new markets for manufactured products
Strategy of product development	Using the new product for the growth in the acclimated market
2. Strategy of integrated growth	Enlarging of the company by adding new structures
Strategy of backward vertical integration	Growth with the help of acquiring subsidiary structures or intensification of the control over the supplier
Strategy of forward moving vertical integration	Growth with the help of increasing control of the distribution structure and selling products
3. Strategy of diversification	Diversified growth
Strategy of centered diversification	The search and use of additional opportunities for manufacturing new goods through new business
Strategy of horizontal diversification	The search for the growth opportunities on the existing market with the help of new product that demands new technology of manufacturing, different from the previous one
Strategy of conglomerate diversification	Expansion of production volume, which methods have no technological link to already manufactured goods. Creating new goods and selling them on new markets
4. Strategy of reduction	Strategy of forces (resources) regrouping
Strategy of "Harvesting"	Refusing the long-term development in favour of getting max income in short period
Strategy of cease activity	Closing or selling the whole departments or subdivisions
Strategy of cost saving	Cost saving events
Strategy of liquidation	Liquidation of ineffective and futureless business

The offered classification of reference strategy consists of four groups of strategic directions of activities of the company to which they follow in the course of the development [4]. The important factor influencing forming of the development strategy of the company is the LCS [9].

Each LCS is characterized by a set of unique characteristics. Many researchers give a lot of different sets of characteristics that define the stages of the company development. In this work Greiner model is used as the basis [3, 7, 15]. It includes 5 stages: birth, growth, stabilization, stagnation and decline (Fig. 1) [3]. Let's watch how the stages of life cycle company that influence forming of development strategy.

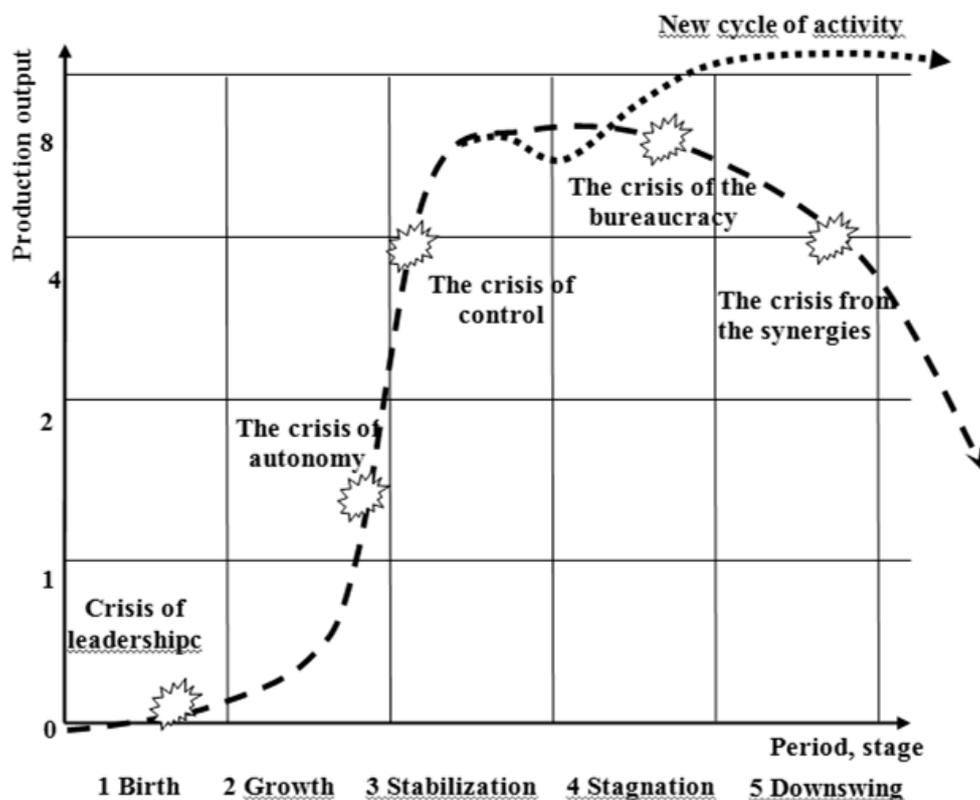


Fig. 1. Stages of life cycle on Greiner's model

On the “birth” stage the product is created and its creation is based on the innovational ideas as the result of the research activity. Then the modification of the product parameters is happening according to the consumer’s demands. On this stage strategies are directed at strengthening market positions and they are characterized by high level of investment activity.

On the “growth” stage the product is already on the market and is acknowledged by the consumers. It can be seen through the significant increase in production volume. The key strategy here is the horizontal and vertical integration strategies. They strengthen the company’s positions in the market. In this period companies have to support growth of the production volumes and conduct its quality transformation simultaneously.

On the “stabilization” stage is taking place saturation of the market. At this stage the organization has stable amount of buyers, production technology and distribution of shares on the market. All the main parameters of activity is reaching its peak and then gradually decreasing. The main strategy here is the strategy of cost saving which is characterized by the lowering of the level of investment activity.

On the stage of stabilization the company management team starts to develop new strategy that would help to diversify its activity and to go to the new stage of development. It leads to the increase in investment policy.

On the “stagnation” stage main characteristics are: demand weakens, number of competitors and line of goods decrease, sales results lower, profit declines and cashflow becomes weak too. The main strategy here is the cost-saving strategy. It is defined by the significant weakening of investment activity.

1.2. Determination of the investment policy

We believe that these peculiar properties of company’s life cycle must be considered while planning its investment activity [11]. The instrument for realization of the central strategic aim is the investment policy which in its turn is characterized by different options intensity of the investment activity.

Economical literature describes investment activity as the intensity of investment performance which is the dynamic process of investing in its main capital and turnover capital in order to achieve strategic aims for company's development [18, 19]. Within the confines of the offered method we use the quantity evaluation of the level of company's investment activity (C_{ia}) as the ratio between the value growth of the capital contribution (as the result of the investments) and the index of internal development source [13]:

$$C_{ia} = \frac{(\Delta NcA + \Delta CA)}{(NP + Am)}, \quad (1)$$

where C_{ia} – index of investment activity; $(\Delta NcA + \Delta CA)$ – increment in value of non-circulating and circulating assets in the period under review; $(NP + Am)$ – cash provided by operating activities in the period under review; NP – net profit in the accounting period; Am – index of amortization in the accounting period.

Index of investment activity C_{ia} is characterized by the evaluation of ratio between value growth of total assets (the result of cashflow from its investment activities) and the value of its internal development sources (the result of operational activities) [13]. Financial activity fulfills the supporting function on balancing the cashflow of investment and operational activity. Therefore, all the types of activity (operational, investing, financial) are being calculated while defining the index of organization's investment activity C_{ia} .

Offered index C_{ia} allows to evaluate the level of company's investment activity in a quantitative form and helps to notice possible errors during forming and management of investment policy.

1.3. Determination of quantitative parameters the stages of lifecycle (LCS)

The intensity of investment activity changes depending on the stage of the life cycle. The number of stages of the life cycle and their names are quite ambiguous because there is no formalized, precise qualitative characteristics of LCS. In the most popular patterns life cycle stages are described by qualitative parameters [15]. Kriteria for qualitative evaluation of integrated index C_{LC} is shown in the Table 2 [16].

The next stage is formalization of interval frame for identification LCS according to the previous stated criteria (Table 2). One part of changing interval frame characteristics of LCS (Table 2) corresponds to Federal Law NO 209 – FZ 24.07.07. On developing small and medium scale entrepreneurship in the Russian Federation; with the Amendments and Additions of 22. 07. 08. No. 556 On limits of revenue from sales (works, service) for each category of small and medium business. The other part is carried out by means of expert opinions.

Criteria of integrated index LCS

Table 2

	Name of the index	Identification	Shifts of index			
			Birth	Growth	Stabilization	Stagnation
1	Index of increments of assets	I	$\geq 4,0$	4,0–2,0	1,0–2,0	$< 1,0$
2	Number of people (thous of people)	N	$\leq 0,1$	0,1–1,0	1,0–10,0	Declining
3	Total Assets (RUB bn)	TA	$\leq 0,02$	0,02–1,5	1,5–15,0	Declining
4	Sales (RUB bn)	V	$\leq 0,06$	0,06–1,5	1,5–25,0	Declining
5	Enterprise age (years)	A	$\leq 3,0$	3,0–10,0	10,0–20,0	Declining

Choosing of numerical expert score of criteria LCS is based on expert opinions of qualitative characteristics. We use the method of quantitative estimation of qualitative characteristics – numerical expert score of Kharrington scale. Due to the chosen method we get quantitative estimation X_i of qualitative characteristics LCS with the usage of formulae:

$$X_1 = \begin{cases} 0.20 & I \geq 4.0 \\ 0.37 & 2.0 \leq I < 4.0 \\ 0.64 & 1.0 \leq I < 2.0 \\ 0.80 & 0 \leq I < 1.0 \\ 1.00 & I < 0 \end{cases} \quad (2)$$

$$X_2 = \begin{cases} 0.20 & N \leq 0.1 \\ 0.37 & 1.0 \leq N < 10.0 \\ 0.64 & 0.1 < N < 1.0 \\ 0.80 & 10.0 \leq N < 20.0 \\ 1.00 & N_t < N_{t-1} \end{cases} \quad (3)$$

$$X_3 = \begin{cases} 0.20 & TA \leq 0.02 \\ 0.37 & 0.02 < TA < 1.5 \\ 0.64 & 1.5 \leq TA < 15.0 \\ 0.80 & 15.0 \leq TA < 50.0 \\ 1.00 & TA_t < TA_{t-1} \end{cases} \quad (4)$$

$$X_4 = \begin{cases} 0.20 & V \leq 0.06 \\ 0.37 & 0.06 < V < 1.5 \\ 0.64 & 1.5 \leq V < 25.0 \\ 0.80 & V \geq 25.0 \\ 1.00 & V_t < V_{t-1} \end{cases} \quad (5)$$

$$X_5 = \begin{cases} 0.20 & A \leq 3.0 \\ 0.37 & 3.0 < A < 10.0 \\ 0.64 & 10.0 \leq A < 20.0 \\ 0.80 & 20.0 \leq A < 50.0 \\ 1.00 & A \geq 50.0 \end{cases} \quad (6)$$

At the next stage we carry out result consolidation X_i with the formula (6) and define the value (estimation) of the integrated index LCS:

$$C_{LC} = \sum_{i=1}^5 X_i, \quad (7)$$

where C_{LC} – are integrated criterion of LCS; X_i – numerical expert score of qualitative criteria that have been gathered by formulae (2)–(6).

According to the concept of traditional organisation development the investment policy is characterized by a definite level of investment activity and dependent on the LCS [13].

1.4. Determination of parameters natural level investment activity of company

We can divide approximately the range of index C_{ia} according to the type of development stage the company is at, based on the acquired research results. The division will be described in the Table 3 [17]. It contains the zones which can be described by specific values of investment activity C_{nat} which defines as “natural level of investment activity”.

Range of C_{nat} index value for different sectors according to sector’s characteristic aspects can be different, but functional dependence of C_{nat} index on life cycle stages is universal.

Values of C_{nat} index on different stages of life cycle

	Name of Stage	Name of Strategy zone	C_{nat} index value
1	Birth	forming new business	$C_{ia} > 4,0$
2	Growth" stage	growth	$2,0 < C_{ia} < 4,0$
3	Stabilization" stage	cost saving	$1,0 \leq C_{ia} \leq 2,0$
4	Stagnation" stage	liquidation	$C_{ia} \leq 1,0$

1.5. Diagnostic model forming of company's investment policy

There are two directions in achieving the strategic aim – gradual and sweeping change. It correlates with natural and specific types of strategic changes in company's activity.

Natural development is understood as gradual character of strategic changes in the course of consistent company's development through carrying out standard strategies and directions of investment policy on different stages of life cycle.

Specific development is understood as interruptive character of strategic changes in the process of radical renewal of business through carrying out strategies that facilitate the diversification of the company's activity.

Usually specific development is carried out on the "stabilization" or "stagnation" stages, because for protection of the provision of the company practices moderate replanning of activities. It is done through exercising diversification strategies, which is one of the most wide-spread and perspective growth and development directions for companies. In some cases it is the only way of their survival.

Stage life cycle of the company takes dominant position of setting directions for strategy sustainable development. Basic principles of the investment policy development are:

- achieving strategic aims;
- growth of balance value of total assets and the value of its internal development sources (cashflow);
- forming of the investment business-portfolio.

It is evident that the process of managing investments is mainly decided by consistent exercising of development strategy as the result of forming appropriate investment policy, consistent with the current stage of company's life cycle.

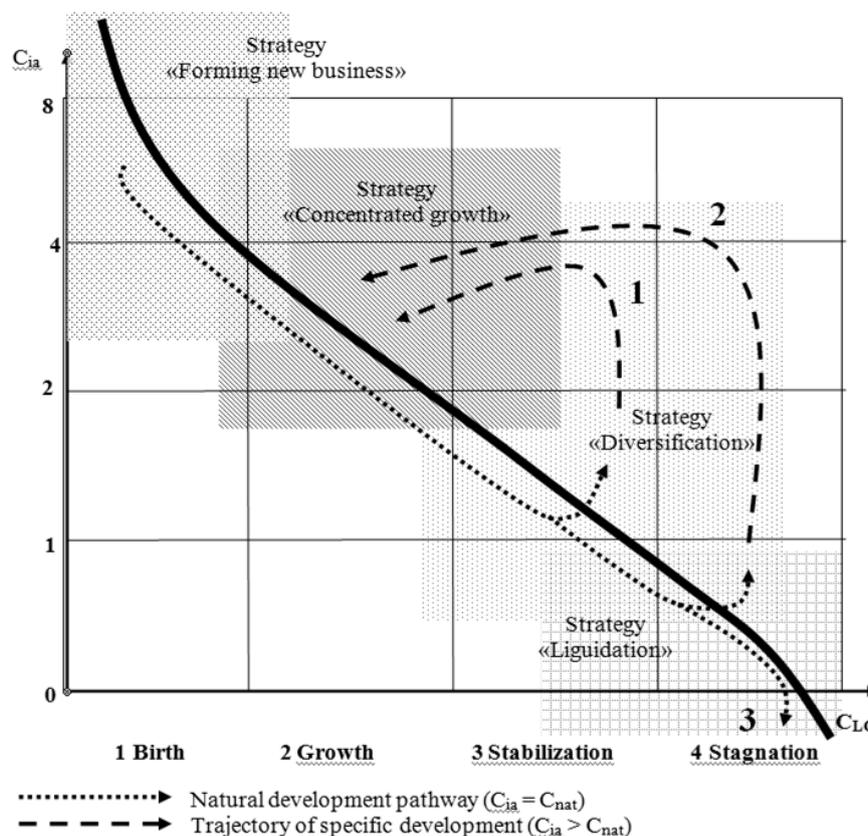


Fig. 2. Dynamics of C_{ia} index in the process of performing natural and specific development strategies

Existing type for evaluation of character of strategic changes in the process of company's development helps to define the type of exercised investment policy on diagnostically matrix (Fig. 2) [16].

Let's analyze the possible directions of C_{ia} index movement on diagnostically matrix.

Natural development pathway (C_{nat}) – 3, is characterized by the steady character of strategic changes in the process of gradual exercising of standard strategies and directions of investment policy from the perspective if evolutionary development of company's business (Table 3 and Fig. 2, bold line).

Trajectory of specific development (C_{ia}) – 1, 2 is characterized by strategic changes in the process of radical business renewal. If the "diversification" strategy and corresponding investment policy are carried out properly, then trajectory of C_{ia} index is directed towards shifting from stage "stabilization" or "stagnation" to stage "growth" (Table 3 and Fig. 2) .

If the investment policy is directed towards performing the strategy for adjusting the C_{ia} index value to a natural level of investment activity (C_{nat}), than it is believed to be the most rational investment policy.

Offered diagnostically model of forming investment policy according to the trajectory of investment activity index (C_{ia}) allows to determine the type of used investment policy and its coordination with for phrased development strategy of the company (Table 4) [16].

Table 4

Correlation of the type of investment policy to the level of investment activity (C_{ia})

	Name of investment policy	Intencity of investment activity
1	Conservative	$C_{ia} < C_{nat}$ (passive)
2	Moderate	$C_{ia} = C_{nat}$ (moderate)
3	Agressive	$C_{ia} > C_{nat}$ (active, high)

Type of investment policy and level of investment activity (Table 4) can be detected as the result of comparing real and natural levels (C_{ia}). The offered methodology of management of development of the organization allows to receive behavioural model which reflects the type of management realized by management.

1.6. Behavioral model style management

The result can be illustrated as behavioral pattern that describes currently practiced type of management that answers the stage of company's life cycle and level of its investment policy [17]. The proposed behavioral model is shown at Fig. 3, it describes 5 zones that characterize the style of company management.

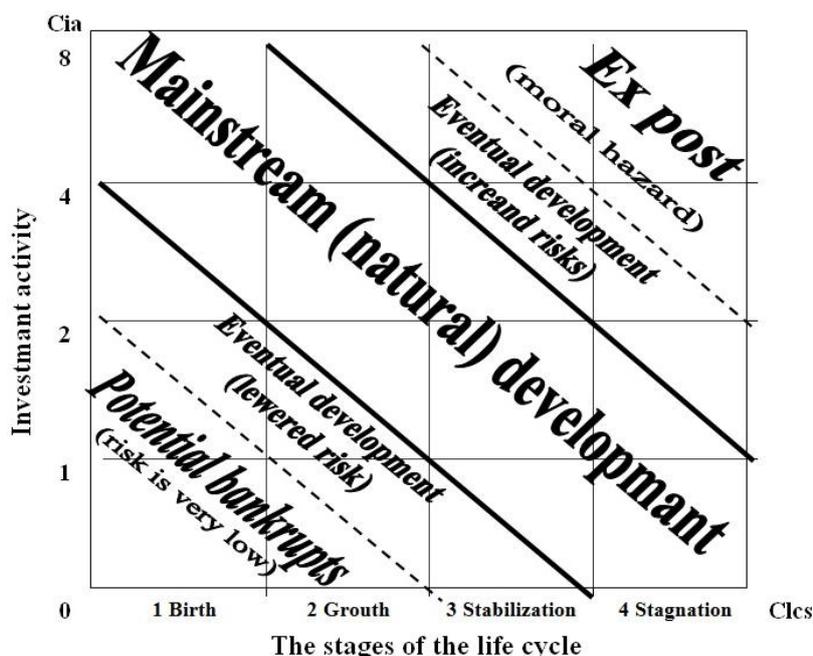


Fig. 3. Evolutional states of the company on the plain " $C_{ia} - C_{nat}$ "

Main zone comply with **mainstream (natural)** level of development. C_{ia} index value is characterized by persistent practicing of standard strategies and related directions of rational investment policy ($C_{ia} = C_{nat}$) from the point of view of company's evolutionary business development.

Zones of “**Eventual development**” (with increased and decreased risks) are connected from downside and from above to a mainstream way of development. The value of C_{ia} index describes all the possible states of business which are triggered by the excessive ($C_{ia} > C_{nat}$) or/and deficient level of outside financing, which in its turn initiate increased or decreased business risks.

“**Potential bankrupts**” zone corresponds to positions that connects from downside to eventual development zone (with lowered risks). Those positions are characterized by significant funding gap with naturally weak internal resources of development in the initial phase. Significant fund gap hinders company's steady development. In this zone all positions are characterized by low financial risk ($C_{ia} \ll C_{nat}$) and high business risk (with gradual supersession of company's share from the market and/or seizure of the share by the competitors).

“**Ex post**” zone with increased risk. In the process of natural development this value of investment activity index (C_{ia}) characterizes irrational (unallowable from the point of view of logical behavior of top management) states. In the process of specific development this value if investment activity index (C_{ia}) can be defined by motiveless behavior of top-managers and foreign investors who give out “inadequate” reaction on the current stages of life cycle, or based on the insider information, or non-market factors (administrative resource, access to stable financing sources etc.).

The positions' area is characterized by high financial risk ($C_{ia} \gg C_{nat}$) which can lead to serious business problems (bankruptcy).

2. Analysis of the investment policy of the type of pipe leading Russian companies

In order to the proposed method we have analyzed the activities of two leading companies of the Russian pipe industry. The study was conducted in several stages. In a first step cleaning and aggregation balance companies [10]. In the second stage we calculated the index of investment activity of the enterprise according to the formula (1). Index calculation results C_{ia} are shown in Table 5.

Table 5

The dynamics of investment activity index C_{ia}

The name	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
JSC “ChTPZ”	0,47	0,34	3,70	7,84	1,57	1,59	1,55	< 0	0,16	0,25	1,52
JSC “VMZ”	0,91	0,25	2,04	1,11	1,00	1,43	0,62	0,14	< 0	< 0	0,53

In the third step assesses the type of investment policy studied industrial companies (Table 5 and Fig. 4).

1. Graphical representation of the dynamics of the indicator C_{ia} Industrial Company JSC Chelyabinsk Tube Rolling Plant is shown in Fig. 2. The value of C_{ia} indicator of investment activity from 2006 to 2007, well below the natural rate, which corresponds to a passive investment policy (Table 5 and Fig. 4). Since 2008, the rate of investment activity C_{ia} rises sharply to 3.7, which indicate an increase in the intensity of investment activities (conducting an aggressive investment policy). In 2009, C_{ia} indicator shows a steady trend of growth in investment activity to $C_{ia} = 7.8$, which is two times higher than the natural rate ($2.0 < C_{ia} < 4.0$). In 2010, investment activity falls to $C_{ia} = 1.57$, corresponds to the stage of maturity. It can be concluded about the active conduct of investment policies since 2007 to 2010, which corresponds to the implementation of a specific development strategy.

The results of analysis of the dynamics of investment activity index confirmed C_{ia} opinion of financial analysts: “... in 2010 of JSC “ChTPZ” completed structural reforms and large-scale investment program aimed at meeting the needs of a complex fuel and energy complex”.

2. Graphical representation of the dynamics of the indicator C_{ia} Industrial Company JSC “VMZ” is shown in Fig. 4. During the period from 2006 to 2010, the value of the investment activity index C_{ia} . It was in the area of the natural values of the level that corresponds to a moderate investment policy (Table 5 and Fig. 4), which also coincides with the opinion of financial analysts.

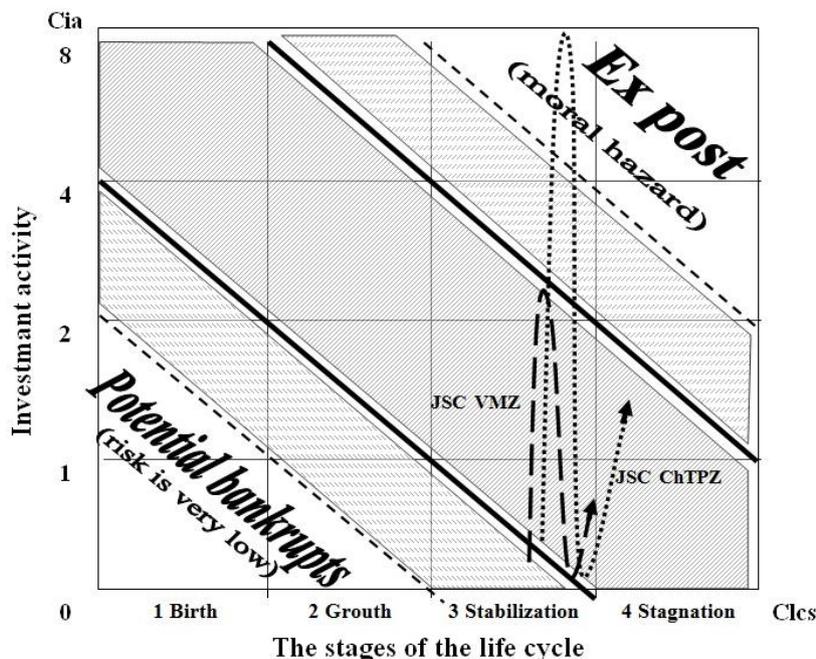


Fig. 4. The dynamics of investment activity index C_{ia} JSC “ChTPZ” and JSC “VMZ”

Comparison of the results of the investment policy of the type of assessment, the two leading plants derived from diagnostic matrix coincide with the opinion of financial analysts and allows to conclude that the proposed method is reliable (Table 6).

Table 6

Comparison of the results of the investment policy of type ratings

Enterprises	External assessment according to financial analysts	Assessment based on the analytical model ($C_{ia} - C_{LCS}$)
JSC “ChTPZ”	active investment policy	active investment policy
JSC “VMZ”	moderate investment policy	moderate investment policy

Conclusions

According to the results of the study, the authors proposed a method (behavioral model) of identifying the style of investment policy in achieving its strategic objectives. The proposed behavioral model, based on the qualitative assessment of the investment activity of companies (C_{ia}) and the integrated index (C_{LCS}) of company.

As a result of testing of the proposed method for evaluating the investment company's policy of metallurgical production, we can conclude:

- diagnostic matrix formation of investment policy allows to determine the type carried out by the investment policy of the company;
- this method can be an instrument of strategic management and evaluation of investment risks of the enterprise.

Therefore, “Ex post” and “Potential bankrupts” zones are characterized by economically irrational behavior from the point of view of financial (very high/very low) risk, that leads to significant problems in business.

Main zone with mainstream (natural) development and eventual development (low and high risk) characterize area of positions where business and finance risks are balanced and can be controlled by top-management of the company.

As a tool for managing the process of strategic development the use of diagnostic and behavioral patterns of forming the investment policy is offered. Developed toolkit allows to diagnose and the pick the right investment policy for company that will advocate to the stage of its development according to formed strategy.

Our model provides a basic framework on the study of the issue relevant to the evolution of human innovative behaviors and the promotion measurement of investment activity. Moreover, behavioral model allows evaluating business risks and identifying the style of top-management behavior.

References

1. Charaeva M.V. [Formation of Investment Policy of the Enterprise]. *Financial Management*, 2010, vol. 2, pp. 97–104. (in Russ.)
2. Gradinaru A. The Contribution of Behavioral Economics in Explaining the Decisional. *Process Procedia Economics and Finance*, 2014, vol. 16, pp. 417–426. DOI: 10.1016/S2212-5671(14)00821-1
3. Greiner L.E. Evolution and Revolution as Organizations Grow. *Readings in Strategic Management*, 1989, pp. 373–387. DOI: 10.1007/978-1-349-20317-8_25
4. Ivashkovskaya I.V., Yangel D.O. [The Life Cycle of Organization and the Average Growth Factor]. *Journal of Corporate Finance*, 2007, vol. 4, pp. 97–110. (in Russ.)
5. Kukharenskiy S.I., Pluzhnikov V.G., Shikina, S.A. [Analysis of Parameters of Business Processes of the Socio-Economic System by the Principle Component Analysis]. *Bulletin of the South Ural State University. Ser. Economics and Management*, 2015, 9 (4), pp. 57–62. DOI: 10.14529/em090409 (in Russ.)
6. Kuselevich E.I., Filonovich S.R. [Models of Life Cycles of the Organizations]. *Menedzhment: vek XX – vek XXI [Management: XX Century – XXI Century]*. Moscow, Ekonomist Publ., 2004, pp. 304–320. (in Russ.)
7. Lester D.L., Parnell J.A., Carraher S. Organizational Life Cycle: A Five-Stage Empirical Scale. *The International Journal of Organizational Analysis*, 2003, vol. 11 (4), pp. 339–354. DOI: 10.1108/eb028979
8. Lin Y.T., Han X.P., Wang B.H. Dynamics of Human Innovative Behaviors. *Physica A: Statistical Mechanics and Its Applications*, 2014, vol. 15 (394), pp. 74–81. DOI: 10.1016/j.physa.2013.09.039
9. Miller D., Shamsie J. Learning Across the Life Cycle: Experimentation and Performance Among the Hollywood Studio Heads. *Strategic Management Journal*, 2001, vol. 22 (8), pp. 725–745. DOI: 10.1002/smj.171
10. Mokeev V.V., Buslaeva O.S., Voronina S.V., Pluzhnikov V.G., Shikina S.A. *Primenenie metoda sobstvennykh sostoyaniy dlya analiza i prognozirovaniya sotsial'no-ekonomicheskikh sistem* [Use of Own States for Analysis and Prognostication of Social and Economic Systems]. Chelyabinsk, South Ural St. Univ. Publ., 2016, 162 p. (in Russ.)
11. Mueller D. A Life Cycle Theory of the Firm. *Journal of Industrial Economics*, 1972, vol. 20 (3), pp. 199–219. DOI: 10.2307/2098055
12. Pluzhnikov V.G., Shikina S.A. [To the Question about the Analysis Parameters of Business Processes of the Production Method of the Native States on the Example of an Industrial Enterprise]. *Management of Economic Systems (Electronic Journal)*, 2014, vol. 70. (in Russ.). Available at: <http://uecs.ru/uecs70-702014/item/3087-2014-10-18-08-24-48>
13. Pluzhnikov V.G., Shikina S.A. [To the Evaluation Stage of the Lifecycle of an Enterprise]. *The Economic Analysis: Theory and Practice*, 2015, 44 (443), pp. 53–64. (in Russ.)
14. Pluzhnikov V.G., Kucharenko S.I., Shikina S.A. Diagnosis as a Tool of Providing Economic Security of Enterprises. *Bulletin of the South Ural State University. Ser. Economics and Management*, 2017, vol. 11, no. 1. pp. 36–44. (in Russ.) DOI: 10.14529/em170105
15. Shefrin H.M., Thaler R.H. The Behavioral Life-Cycle Hypothesis. *Economic Inquiry*, 1988, vol. 26, pp. 609–643. DOI: 10.1111/j.1465-7295.1988.tb01520.x
16. Shirokova G.V. [Characteristics of Life cycle Stages of Russian Companies Created from Scratch]. *Russian Management Journal*, 2007, vol. 5, no. 4, pp. 3–20. (in Russ.)
17. Smagin V.N., Shikina S.A. [A Regression Analysis of the Dependence of the Level of Investment Activity on the Life Cycle Phase of Production]. *Bulletin of the South Ural State University. Ser. Economics and Management*, 2012, vol. 9 (268), pp. 88–90. (in Russ.)
18. Wielhouwer J.L., De Waegenare A., Kort P.M. Optimal Dynamic Investment Policy for Different Tax Depreciation Rates and Economic Depreciation Rates. *Journal of Optimization Theory and Applications*, 2000, 106: 23. DOI: 10.1023/A:1004650906179

19. Young D. [Economic Value-Added: A Primer for European Managers]. *European Management Journal*, 1997, vol. 15, pp. 335–343. DOI: 10.1016/S0263-2373(97)00014-5

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ДИАГНОСТИЧЕСКАЯ МОДЕЛЬ АНАЛИЗА УПРАВЛЕНЧЕСКИХ РИСКОВ

В.Г. Плужников, С.И. Кухаренко, С.А. Шикина

Южно-Уральский государственный университет, г. Челябинск, Россия

Большое внимание в научных и научно-практических статьях уделяется проблеме управления рисками. Однако вопросы теории и практики построения систем и политики управления рисками компании остаются недостаточно разработанными. Решение задач сравнительной оценки уровня рисков при выборе инвестиционной политики, реализации выбранной стратегии развития компании актуально при обеспечении устойчивости процесса стратегического развития. Оценка стиля управления и уровня управленческих рисков проводится на основе экономико-математической модели количественной оценки качественных параметров. Анализ проводится путем сравнения фактического уровня его инвестиционной активности с эталонным значением, учитывающим этап жизненного цикла (LCS) компании. В работе применяется общепринятая классификация этапов LCS и метод количественной оценки интегрального индикатора инвестиционной активности компании. Предложена диагностическая модель анализа уровня управленческих рисков при реализации инвестиционной политики сформулированной стратегии развития компании. Разработанный математический инструмент позволяет проводить диагностику уровня управленческих рисков, стиль управления, а также тип инвестиционной политики реализуемой компанией в зависимости от этапа LCS компании.

Ключевые слова: управленческие риски, поведенческая модель, естественный уровень инвестиционной активности, стадия жизненного цикла компании.

Литература

1. Чараева, М.В. *Формирование инвестиционной политики предприятия* / М.В. Чараева // *Финансовый менеджмент*. – 2010. – № 2. – С. 97–104.
2. Gradinaru, A. *The Contribution of Behavioral Economics in Explaining the Decisional* / A. Gradinaru // *Process Procedia Economics and Finance*. – 2014. – Vol. 16. – P. 417–426. DOI: 10.1016/S2212-5671(14)00821-1
3. Greiner, L.E. *Evolution and Revolution as Organizations Grow* // *Readings in Strategic Management*. – 1989. – P. 373–387. DOI: 10.1007/978-1-349-20317-8_25
4. Ивашковская, И.В. *Жизненный цикл организации и агрегированный показатель роста* / И.В. Ивашковская, Д.О. Янгель // *Корпоративные финансы*. – 2007. – № 4. – С. 97–110.
5. Кухаренко, С.И. *Анализ параметров бизнес-процессов социально-экономической системы методом главных компонент* / С.И. Кухаренко, В.Г. Плужников, С.А. Шикина // *Вестник ЮУрГУ. Серия «Экономика и менеджмент»*. – 2015. – Т. 9, № 4. – С. 57–62. DOI: 10.14529/em090409
6. Кушелевич, Е.Ю. *Модели жизненных циклов организаций* / Е.Ю. Кушелевич, С.Р. Филонович // *Менеджмент: век XX – век XXI*. – М.: *Экономистъ*, 2004. – С. 304–320.
7. Lester, D.L. *Organizational Life Cycle: A Five-Stage Empirical Scale* / D.L. Lester, J.A. Parnell, S. Carraher // *The International Journal of Organizational Analysis*. – 2003. – 11 (4). – P. 339–354. DOI: 10.1108/eb028979

8. Lin, Y.T. Dynamics of human innovative behaviors / Y.T. Lin, X.P. Han, B.H. Wang // *Physica A: Statistical Mechanics and its Applications*. – 2014. – 15 (394). – P. 74–81. DOI: 10.1016/j.physa.2013.09.039

9. Miller, D. Learning across the life cycle: Experimentation and performance among the Hollywood studio heads / D. Miller, J. Shamsie // *Strategic Management Journal*. – 2001. – 22 (8). – P. 725–745. DOI: 10.1002/smj.171

10. Применение метода собственных состояний для анализа и прогнозирования социально-экономических систем / В.В. Мокеев, О.С. Буслаева, С.В. Воронина и др. – Челябинск: Издат. центр ЮУрГУ, 2016. – 162 с.

11. Мюллер, Д. Теория жизненного цикла фирмы / Д. Мюллер // *Журнал промышленной экономики*. – 1972. – 20 (3). – P. 199–219. DOI: 10,2307 / 2098055

12. Плужников, В.Г. К вопросу об анализе параметров бизнес-процессов производства методом собственных состояний на примере промышленного предприятия / В.Г. Плужников, С.А. Шикина // *Управление экономическими системами: электрон. науч. журн.* – 2014. – № 70. – <http://uecs.ru/uecs70-702014/item/3087-2014-10-18-08-24-48>.

13. Плужников, В.Г. К вопросу оценки этапа жизненного цикла предприятия / В.Г. Плужников, С.А. Шикина // *Экономический анализ теория и практика*. – 2015. – № 44 (443). – С. 53–64.

14. Плужников, В.Г. Диагностика как инструмент обеспечения экономической безопасности предприятия / В.Г. Плужников, С.И. Кухаренко, С.А. Шикина // *Вестник ЮУрГУ. Серия «Экономика и менеджмент»*. – 2017. – Т. 11, № 1. – С. 36–44. DOI: 10.14529/em170105

15. Shefrin, H.M. The behavioral life-cycle hypothesis / H.M. Shefrin, R.H. Thaler // *Economic Inquiry*. – 1988. – Vol. 26. – P. 609–643. DOI: 10.1111/j.1465-7295.1988.tb01520.x

16. Широкова, Г.В. Характеристика стадий жизненного цикла российских компаний, созданных «с нуля» / Г.В. Широкова // *Российский журнал менеджмента*. – 2007. – Т. 5, № 4. – С. 3–20.

17. Смагин, В.Н. Регрессионный анализ зависимости уровня инвестиционной активности от этапа производства жизненного цикла / В.Н. Смагин, С.А. Шикина // *Вестник ЮУрГУ. Серия «Экономика и управление»*. – 2012. – № 9 (268). – С. 88–90.

18. Wielhouwer, J.L. Optimal dynamic investment policy for different tax depreciation rates and economic depreciation rates / J.L. Wielhouwer, A. De Waegenaere, P.M. Kort // *Journal of Optimization Theory and Applications*. – 2000. – 106: 23. DOI: 10.1023/A:1004650906179

19. Young, D. Economic Value-Added: A Primer for European Managers / D. Young // *European Management Journal*. – 1997. – Vol. 15. – P. 335–343. DOI: 10.1016/S0263-2373(97)00014-5

Плужников Владимир Германович, старший преподаватель, кафедра экономической безопасности, Южно-Уральский государственный университет, г. Челябинск; pluzhnikovvg@susu.ru.

Кухаренко Сергей Иванович, канд. экон. наук, доцент, кафедра экономики и управления на предприятиях строительства и землеустройства, Южно-Уральский государственный университет, г. Челябинск; kukharenkosi@susu.ru.

Шикина Светлана Артуровна, канд. экон. наук, доцент, кафедра экономической безопасности, Южно-Уральский государственный университет, г. Челябинск; shikinasa@susu.ru.

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