

Methodological Approach to Analysis of Business-organization Development Factors at Life Cycle Stages

Krivtsova N.N.*

Voronezh State University of Engineering Technologies
Voronezh, Russia
e-mail: titovanadya2012@mail.ru

Strukov G.N.

Voronezh State University of Engineering Technologies
Voronezh, Russia

Salikov Y.A.

Voronezh State University of Engineering Technologies
Voronezh, Russia
e-mail: saural@rambler.ru

Sukhareva I.A.

Voronezh State University of Engineering Technologies
Voronezh, Russia

Abstract — The subject of the study is the factors of business-organization development. The purpose was to form a methodological approach to the analysis of business-organization development factors at various stages of its life cycle. The article systematizes the problem of business-organization development at various stages of its life cycle. As a result of the research, the following tasks were solved: the necessity of studying the development of a business-organization at various stages of its life cycle was considered and substantiated; the essence of factors influencing the development of a business-organization was revealed; a methodical approach to evaluation of a business-organization development was proposed; an algorithm for calculating the index of a business-organization development was proposed. In the article, it is proposed to consider factors influencing the development of a business-organization at the stages of its life cycle. The proposed methodological approach to the analysis of development factors makes it possible to reflect the state and prospects of a business-organization functioning; to estimate efficiency of a business-organization depending on the stage of development under the influence of the factors: financial resources, economic security of the enterprise, external and internal relations, image of the enterprise, development resources. The advantages of such methodical approach are the possibility to take into account the peculiarities of development of business-organizations at different stages of their life cycle.

Keywords — *development, business-organization life cycle, environmental factors, system of indicators, integral development index.*

I. INTRODUCTION

In the conditions of unpredictability and uncertainty of the modern Russian reality of the industrial business-organization it is practically impossible to plan and predict the situation for the long term. The decisive factor of survival and successful activity of the majority of business-organizations is their ability not only to adapt to changes in the external and internal environment, but also to be ahead of such changes. Therefore, the priority task of a business-organization is not only to overcome crisis situations, but also to achieve sustainable and maximum effective development.

Development is one of the main goals of any business-organization functioning, as it provides satisfaction of new

consumers' needs; increase of organization's competitiveness and strengthening of its positions in the international arena; creation of financial and technological basis for further development, etc.

It is an undeniable fact that any business-organization has different stages of development of its own activities, which are built on the curve of its life cycle. The integral element of the stage of forecasting an industrial business-organization and building strategic guidelines for its work in certain market segments is the study of life cycle stages, as well as their duration, which later becomes the basis for building a management system.

The theory of a business-organization's life cycle provides an opportunity to see dynamic changes, as well as to draw conclusions about timeliness and efficiency of managerial decisions. Life cycle curves are able to give a systematic view of problems that appear in the process of business-organization activity. These curves make it possible to determine at what stage of the life cycle a business-organization is at, to predict the direction of its development and the emergence of critical situations, i.e. give an opportunity to prepare for them properly, which provides timely forecast information to the management of the organization and allows focusing on solving real development problems.

II. LITERATURE REVIEW

It is reasonable to understand under development of a business-organization the process of successive transitions of the management system from one state to another as a result of irreversible, directed, natural changes in equipment, technology, labor organization and management depending on changing conditions and implies development of new goals and creation of conditions for transition from one specific goal achieved in the process of business-organization functioning to another.

At the same time, it is important that the process of business-organization development is not threatened by anything. Otherwise, the business-organization will lose the opportunity to achieve the next goal and will cease to function.

The analysis of literature sources on the theory of life cycle of a business-organization has shown that many authors are of the opinion that the process of development of a business-organization occurs due to changes in stages of the life cycle – as a process of life activity. In different sources, researchers distinguish between two to ten stages of the life cycle of a business-organization, and the concept of the life cycle may be based on different approaches to its structuring.

Experts began to study the theory of the life cycle of a business-organization in the early 20th century. Already in the middle of the 20th century these attempts received the form of theories and approaches. Thus, this problem was studied in detail by such foreign and domestic scientists as I. Adizes, C. Cameron, R. Quinn, A. Kovalenko, R.L. Daft, D. Miller, S. Hanks, H. Chandler and others. The classic model of the life cycle of a business-organization, which is given in the works of these scientists, can be presented in a generalized form (Figure 1) [1, 2, 3].

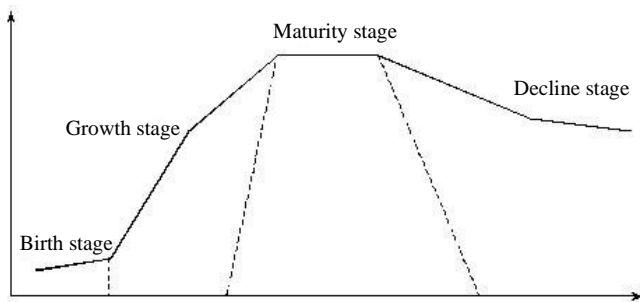


Fig. 1. Classic business-organization life cycle model

Despite the fact that the theory of the life cycle of a business-organization is relatively young (founded in 1959 by foreign scientists M. Heyer, J. Lipitt, A. D. Chandler), it is sufficiently researched in many scientific papers. Most of them contain a study of the life activities of a business-organization and the construction of various models of the life cycle, the analysis of components in the form of stages or stages of organizational processes occurring at each of them, and the analysis of obstacles [4, 5]. This research provides an opportunity to get additional insight into the dynamic features of business-organization functioning and development processes.

Since there was a planned system in the Russian economy prior to the 1990s, there was practically no research into the nature of the life cycle of a business-organization under competitive conditions. The most significant and outstanding works on this subject of research are foreign refinements. Foreign scientists paid attention to the possibility of presenting the functioning of a business-organization in space and time using the life cycle as an analogue of biological organisms development. This process in the beginning and in the middle of XX century was preceded by the formation of management theory, different approaches to management, origin of new corporations with a large content of intellectual capital (the era of computer appearance and development of high-tech industries) [6, 7].

Nowadays the scientific literature offers many models of the life cycle of a business-organization, differing in number,

content and sequence of stages, as well as attempts to identify quantitative and qualitative changes that lead to the transition of a business-organization from one stage to another within each of them [8]. There is no doubt that the movement of a business-organization along the life cycle trajectory generates different tasks and specific directions for their solution at each stage.

In our opinion, each stage of the life cycle has its own set of typical tasks. Having correctly defined at what stage of development the business-organization is, it is possible to allocate at once the whole complex of problems and directions of their decision, most often meeting at the given stage of life cycle. This is very important, as wrong definition of operational, tactical and strategic tasks at each stage of the life cycle of a business-organization leads to wrong conclusions and actions, which will serve as a basis for vulnerability of the business-organization with the possibility of its further bankruptcy.

Thus, each stage of a business-organization's life cycle has its own peculiarities, which, in their turn, determine the most vulnerable places in the activities of a business-organization.

At the birth stage, an entrepreneur needs to find funds to finance expenses related to the lease or acquisition of office and production premises, equipment, etc., as financial institutions are unwilling to lend to new enterprises without appropriate guarantees. Working capital is important, because the start-up capital is spent on the acquisition of fixed assets, which do not yet make a profit. A new business-organization may find itself in a situation where it does not receive loans from suppliers, but at the same time has to lend to its own clients in order to win the market. The last problem is the lack of necessary experience of the managers of the start-up company.

During the growth phase, there is an increase in output that requires additional fixed capital, especially if the business-organization has to borrow long-term in order to compete in different markets. There is a risk of too rapid expansion, which could lead to overproduction.

At the stage of maturity, a business-organization has its own market niche, the financial situation is stable. The scheme of business-organization development shows that at this stage the entrepreneur has two possible development options. Either he sets a goal – to keep the achieved positions (and, accordingly, the business-organization remains at the maturity stage) or he starts to consider ways for further development (accordingly, the business-organization finds itself at the growth stage). A business-organization, which is at the stage of maturity, can renew fixed assets, carry out additional research and development, i.e. bear the same costs as at the birth and growth stage. But the financial needs are already more individual. According to specialists, the main attention should be paid to the control of cash flows [9]. It may be necessary to use financial instruments to reduce risks. If the option of further development is chosen, the business-organization will need new fixed assets for the acquisition of which additional financial resources are attracted. New loans create an additional burden on the business-organization. In case of unsuccessful development the company may face

financial problems. In case of successful development, the entrepreneur should not allow too rapid expansion to avoid overproduction.

The next stage of a business-organization's life cycle is old age or decline. It is characterized by a decline in demand, a fall in sales volumes and income. Money flows become negative. There is an urgent need to find new opportunities, areas for business, reducing costs while striving to keep the minimum required level of income. If the measures at the stage of recession have failed, the business organization is forced to liquidate or at least to change its owner.

III. METHODOLOGY

The development of a business-organization is influenced by various factors. In contrast to the phenomena caused exclusively by external forces, the development of a business-organization is a natural process of self-organization, when the internal state of the system becomes a source of qualitative positive changes [10, 11].

The first group includes factors that are vital for a business-organization (Table 1). This may include raw materials, materials, money, etc., i.e. financial resources available to the business-organization and capable of satisfying its production and economic activities in the current period of time. At the birth stage, this group of factors has the greatest impact on the business activity and further development of a business-organization.

TABLE I. CHARACTERISTICS OF BUSINESS-ORGANIZATION DEVELOPMENT FACTORS

Business-organization development factors	Essence of factor
Financial resources	Development of production logistics plans allows accumulating material, labor and financial resources needed to solve the tasks.
Economic security of business-organizations	One of the conditions for economic development, ensures stable and effective functioning of the business-organization and high potential for development in the future.
External and intra-company relations	Form the structural integrity of the business-organization; ensure coherence and coordination of the work of all departments and units within the business-organization and with the external environment.
Business-organization image	It provides attraction of investments, high competitiveness on the market, expands the sphere of influence on the market, defines profitability of the business-organization.
Resources for development	Ensure quantitative and qualitative changes in the business activity of the business-organization in order to survive and compete in changing external conditions

The second group of factors is related to the economic security of a business-organization, as a stable and safe state is the basis of competitiveness and further development. At the stage of growth of a business-organization, there is no sufficient satisfaction in financial resources and there is a need to ensure economic security.

Having overcome the influence of factors of the first and second groups, the business-organization enters the maturity stage, where it faces the need to establish external and internal relations, as well as acquire a positive image.

The third group of factors is the external and internal relations of the business-organization, which provide relationships and linkages to maintain structural integrity, coherence and coordination of all links within the organization and with the environment. The fourth group of factors ensures that the business-organization builds a positive image and business reputation.

The fifth group of factors, which includes development resources, characterizes a business-organization as being able to make qualitative and quantitative changes in business activities and thus increase the efficiency and effectiveness of its activities. If development resources are available, a business-organization is able not only to overcome critical situations, but also to anticipate them.

On the basis of the presented development factors of a business-organization, a system of indicators can be formed which is used to manage the performance of a business-organization at the stages of its life cycle. The system of indicators should contain performance indicators, due to which it is possible to measure and control the process of business-organization development at each stage.

IV. ASSESSMENT METHODOLOGY

Having singled out 5 important factors of the business-organization environment affecting its development, we suggest considering the components of these factors and assessment indicators for each component (Table 2).

To develop a methodological approach to the development of a business-organization, we present an algorithm that allows presenting the development of a business-organization as a multi-component phenomenon in the form of a set of development factors, their components and indicators.

In order to obtain the final result – evaluation of the level of development of a business-organization in the form of an integral development index, let us consider in more detail the algorithm of its calculation. Calculation of the integral development index of a business-organization can be presented in stages (Figure 2).

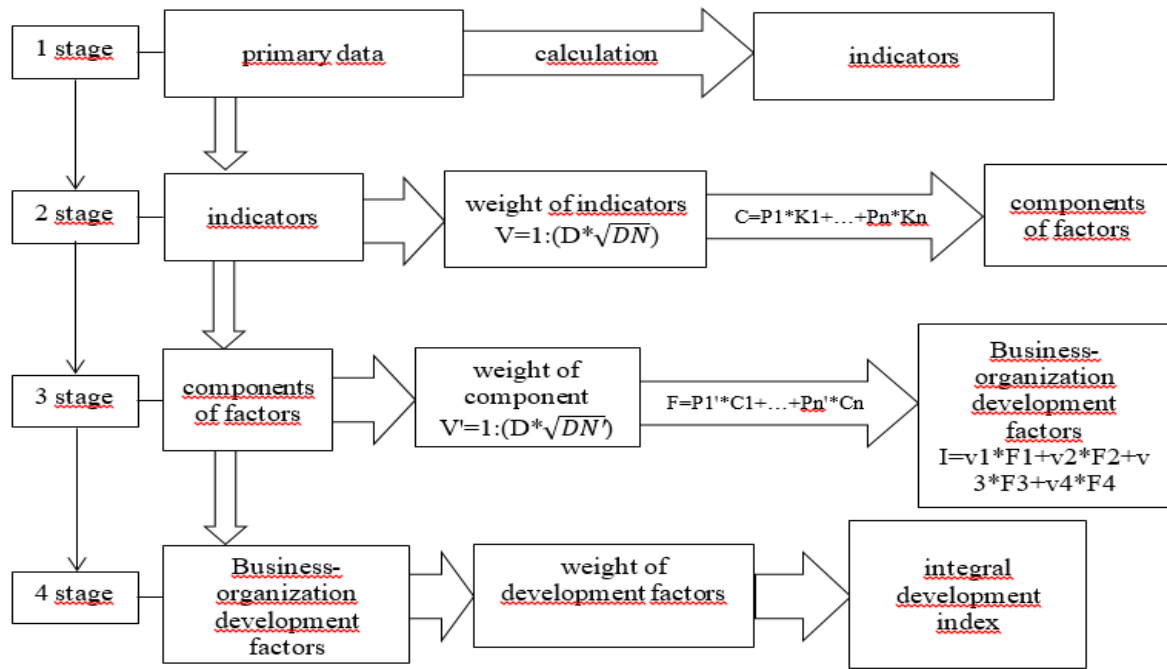


Fig. 2. Mechanism for calculating the integral development index

TABLE II. COMPONENTS AND INDICATORS OF BUSINESS-ORGANIZATION DEVELOPMENT FACTORS ASSESSMENT

Business-organization development factors	Components of business-organization development factors
1 «Financial resources»	Financial stability (coefficient of autonomy, ratio of borrowed and own funds (financial leverage), coefficient of maneuverability of own working capital, etc.)
	Solvency (absolute liquidity ratio, critical liquidity ratio, etc.)
	Business activity (asset turnover ratio, current asset turnover ratio, cash flow ratio, etc.)
2 «Economic security»	Material and technical security (stock availability, material security, etc.)
	Financial security (financial leverage coefficient, coefficient of security of current assets with own current assets, etc.)
	Personnel security (average annual salary per employee, labor productivity, etc.)
	Efficiency of operations (level of return on total capital, level of return on equity, etc.)
3 «External and intra-company relations»	Intra-company relations (loyalty index of employees, share of employees with advanced training, etc.)
	External relations (ratio of revenues to marketing costs, consumer loyalty index, etc.)
4 «Business-organization image»	Image of business-organization at consumers (quality, design, product characteristics, brand awareness, etc.)
	Business-image (information openness of the enterprise, partners' ideas about the declared mission and strategies of the enterprise, etc.)
	Image for state structures (importance of enterprise products for the region, participation of enterprise in social programs, etc.)
	Social image (social campaigns conducted by the enterprise, enterprise compliance with environmental standards, etc.)
5 «Resources for development»	Internal image (level of loyalty of the management to the personnel, level of information openness of the management, etc.)
	Efficient use of innovations (share of employees who are inventors and innovators, share of own investments in technological innovations in total expenditures on innovations, etc.)
	Efficiency in the use of investment (share of fixed capital investment, share of investment in total innovation expenditure, etc.)

Thus, at the first stage, primary data are processed and the indicators are calculated using the appropriate formulas. At the second stage, using the calculated indicators, we calculate their weight, and then get the components of each factor of the business-organization environment. The third stage is calculated by analogy with the previous one. At the fourth stage, having calculated each factor using weighting coefficients, we will find an integral development index.

Indications: P_i – i-th weight of the j-th index; D – average square deviation; DN – value of deviation from the normative values of the index; C – value of the component; K_i – value of the i-th index; P_i' – i-th weight of the j-th index; F – value of the development factor; I_{di} – integral development index.

V. ANALYSIS

The algorithm of the methodological approach to determining the level of development of a business-organization consists of certain stages. The first stage was based on clear criteria. Dependent indicators should be avoided, as well as indicators that complement each other, inverse coefficients and such coefficients that actually carry the same semantic economic load.

The next step in the development of a methodological approach to the definition of an integral development index is to calculate the components of each factor, which will be by combining the values of indicators calculated at the previous

stage. For each indicator its "weight" will be calculated and on this basis the components are obtained by formula:

$$C_j = \sum_{i=1}^n P_i * K_i$$

where C_j – j-th component of the factor;

K_i – i-th indicators;

P_i – weight i-th indicators;

n – the number of indicators included in the component.

"Weight" for each indicator will be calculated on the basis of three conditions.

First, given the nature of the indicator, which provides that all indicators are considered in each individual component, which relate to the same direction of the business-organization, that is, they express some values, making this direction, and we should combine the values of these values into one component. At the same time, it would be advisable to avoid repeating these values twice.

Secondly, we should consider the value of the indicator. Depending on the formula for calculating indicators, the value of some of them may, for example, be mainly within the range of ± 0.1 of the average, while the values of others may be within the range of ± 0.5 of the average. This does not indicate that the impact of the second indicator is more important. This means that, based on the calculation formulas, we can get a result with the scattering of data of the first indicator, which is much smaller than the scattering of data of the second indicator, i.e. the values of these indicators have "different weight category", but they should affect the component of the factor equally.

Thus, in order to ensure comparability of the obtained calculation data it is necessary to bring our indicators into "one weight category" of significance, where their values will be equal. We will do the following: compensate by "weight" for the lack of values of some indicators and overshoot the values of other indicators. To do this, we calculate the average square deviation (scatter) of values for each indicator, and the less we get the average square deviation, the greater "weight" is assigned to this indicator.

Thirdly, we should pay attention to the importance of the indicator. Let's consider how close the values of indicators are to the critical value of transition from a sustainable to an unstable enterprise. An indicator whose value is closer to the critical one should have a greater "weight" than an indicator whose value is far from the critical one. However, we will take into account not just inverse dependence, but inverse dependence and the root is square, because the average values of some indicators are almost the same as the norm, while other average values of indicators may deviate significantly from the norm.

When using raw values of deviations from the norm, the result can be "weights", which will be hundreds of times different from each other. In order to prevent this fact, it is

necessary to turn the obtained values of deviations from the norm by reducing their relative value using the square root.

Based on these 3 conditions, an algorithm for calculating the "weights" of indicators has been built, which includes:

1. Data preparation: calculation of average indicators for each component of the business-organization.

2 Determining the "weight" of each indicator on the basis of the 3 above conditions using the average indicators of the business-organization.

3 Determining the component using the "weight" of indicators and values of indicators.

A further step in determining the level of development of a business-organization is the calculation of each development factor, which we propose to calculate by combining the values of the components included in this factor. For each component, its "weight" will be calculated, and on this basis we will evaluate the level of the components using the formula:

$$F_j = \sum_{i=1}^n P'_i * C_i$$

where F_j – j-th business-organization development factors;

C_i – i-th component;

P'_i – the weight of the i-th component;

n – the number of components included in the factor.

"Weight" for each component will be calculated based on 3 requirements that differ from previous calculations of indicator weights.

First, the "essence" of the component is the following: all components considered in each development factor must express this factor.

In this case, unlike the calculation of indicator weights, all components will be "independent" of each other, as they relate to different directions of the factor. Therefore, their "similarity" (the essence of correlation), on the contrary, suggests the importance of these indicators, that they have a common, equal value that creates and guides the vector of sustainable development of the business-organization.

Secondly, the following two conditions: The "value" of the component and the "importance" of the component are identical, as in the case of calculating indicator "weights".

Based on these 3 conditions, the methodology for calculating the component "weights" has been constructed, which is necessary for further defining each development factor. Calculation of components for determining the development factors of a business-organization will look as follows:

1. Data preparation: calculation of average component values for each factor.

2 Determining the "weight" of each component of the factor on the basis of 3 above conditions using the average values of the business-organization.

3 Determining the values of each factor using the "weight" of the component and the value of the component.

The final stage of the methodological approach is calculation of the development index. The development index is calculated by combining the values of development factors. For each factor, we will determine its weight and calculate the development index by formula:

$$I_d = P_{fr} * F_{fr} + P_{es} * F_{es} + P_i * F_i + P_{eir} * F_{eir} + P_{dr} * F_{dr}$$

where P_{fr} , F_{fr} – weight and financial resource index;

P_{es} , F_{es} – weight and index of economic security;

P_i , F_i – business-organization image weight and index;

P_{eir} , F_{eir} – weights and index of external and internal relations;

P_{dr} , F_{dr} – development resource weight and index.

Thus, the proposed methodological approach to development assessment can be used both by the business-organization itself to carry out a comprehensive analysis of its activities, and by government agencies in developing a sustainable development strategy.

VI. DISCUSSION

The study of the business-organization life cycle model can serve as an important tool for early crisis diagnostics, which enables the management to carry out strategic and tactical transformations in a timely manner, and, as a result, improve the efficiency of the business-organization.

A detailed study of this area will provide an opportunity to better understand the essence and nature of processes caused by cyclical development of a business-organization and will significantly improve the efficiency of early diagnostics of financial crisis and management mechanisms applied at various stages of its life cycle.

Thus, a system of business-organization development factors has been formed based on their components, and these factors have been substantiated and structured. It was found that five environmental factors influence the development of a business-organization: financial resources, economic security, external and internal relations, image of the business-organization and development resources. It was found that each factor depends on a certain number of components, which are determined by the system of indicators.

The proposed methodological approach implies the calculation of an integral development index. For this purpose, the algorithm of consistent actions, presented in stages, has been developed.

VII. CONCLUSION

In the process of developing a methodological approach to the analysis of business-organization development factors at the life cycle stages, the following main provisions should be taken into account:

- at each stage of a business-organization's life cycle, it is possible not only to overcome critical situations, but also to anticipate them;
- development of a business-organization at the stages of its life cycle is influenced by the following factors: financial resources, economic security, image of the business-organization, external and internal relations, development resources;
- the basis of the methodological approach for determining the level of development of a business-organization are preliminary identified development factors, presented by components and relevant indicators;

The study of development factors of a business-organization provides an opportunity to significantly improve the efficiency of early diagnostics of the financial crisis and management mechanisms applied at various stages of the life cycle of a business-organization.

References

- [1] I. Adizes, *Corporate Lifecycles: How and Why Corporations Grow and Die and What to Do about It*, Englewood Cliffs, New Jersey: Prentice Hall, 1989, 394 p.
- [2] I. Adizes, *Managing Corporate Life Cycles*, Englewood Cliffs, New Jersey: Prentice Hall, 1999, 57 p.
- [3] L. Greiner, "Evolution and Revolution as Organizations Grow", *Harvard Busin. Rev.*, pp. 37–46, July-August 1972.
- [4] G.L. Lippitt, W.A. Schmidt, "Crisis in a Developing Organization", *Harvard Busin. Rev.*, vol. 45, pp. 102–112, 1967.
- [5] A.D. Chandler, Jr. *Strategy and Structure*. Cambridge, MA: MIT Press, 1962, pp. 23–25.
- [6] W.R. Torbert, "Pre-bureaucratic and post-bureaucratic stages of organization development", *Interpersonal Development*, vol. 5, pp. 1–25, 1974.
- [7] J.L. Kimberly, "Issues in the creation of organization: initiation, innovation and institutionalization", *Acad. of Manag. J.*, vol. 22, pp. 437–457, 1979.
- [8] A. Downs, *The life cycle of bureaus*, Downs A. (ed.), *Inside bureaucracy*. San Francisco: Little, Brown, 1967, pp. 296–309.
- [9] I. Adizes, "Organizational Passages – Diagnosing and Treating Lifecycle Problems of Organization", *Organizational Dynamics*, vol. 8, pp. 3–25, 1979.
- [10] Y.A. Salikov, "Problems and opportunities to improve the concept of balanced development of business organizations", *Proc. of the Voronezh State Univer. of Engineer. Technol.*, vol. 70, no. 4, pp. 391–403, 2016. Retrieved from: <https://doi.org/10.20914/2310-1202-2016-4-391-403>
- [11] A.I. Khorev, Y.A. Salikov, N.A. Serebryakova, "Conceptual features of the balanced development of business organizations", *Asian Soc. Sci.*, vol. 20, pp. 22–28, 2015.