

Investments in the system of controlling of organizations of the agricultural complex

Svetlana M. Bychkova
St. Petersburg State Agrarian University
Department of Accounting and Auditing
Saint-Petersburg, Russia
sbychkova@mail.ru

Dmitry V. Elyashev
St. Petersburg State Agrarian University
Department of Accounting and Auditing
Saint-Petersburg, Russia
smee@list.ru

Elena A. Zhidkova
Kemerovskii State University
Department of Accounting, Analysis, Auditing and Taxation
Kemerovo, Russia
291154@mail.ru

Abstract — The study focuses on the organization of the system of investments controlling in organizations of the agro-industrial sector. The objectives of the study is to resolve the issue of identifying the controlling of investments from the point of view of the tetrad theory in the context of a non-systemic approach to the study of economic phenomena, studying on the basis of research of domestic and foreign authors of various theoretical aspects of the organization of controlling investments, consideration of issues related to the tasks of controlling investment in the agro-industrial sector, instruments for controlling investments and indicators characterizing investment efficiency within the controlling system, as well as identifying the specifics of controlling investments in the agro-industrial sector and characterizing the efficiency of investments in agricultural production in the Russian Federation. The methodological basis of the research is general scientific and special methods of scientific research; abstract-logical research methods are used: methods of analysis and synthesis, classification and generalization, induction and deduction, statistical methods for analyzing economic phenomena, as well as tabular and graphical methods of statistical data.

Keywords — *investments, controlling system, system of indicators*

I. INTRODUCTION

For the organization of expanded reproduction in the sector of the agro-industrial complex, investments play the most important role. Investments in the main production assets of economic entities conducting their activities in the agricultural sector (agricultural land, production and storage

facilities, a herd of farm animals) help to expand and modernize production facilities; investments in intangible assets (patents, licenses, research and development related to improving the quality of economic activities, breeding achievements in the field of crop and livestock production, innovative means of protecting plants and animals, increasing the fertility of agricultural land, etc.) intensity; investments in current assets - to increase business performance and ensure smooth operation.

Investment management is therefore an important task for the management of the organization. It is necessary to manage investments in an integrated approach, along with other aspects of the organization's economic life, such as production, personnel, logistics, marketing or finance, as well as comprehensive application of various aspects of management, such as planning, forecasting, accounting, analysis, operational and strategic regulation, and control. The controlling system is designed to solve these problems in a complex way that allows solving such problems.

The problems of controlling investments are devoted to various works of domestic and foreign scientists. The issues of controlling investments and, in particular, the system of estimated indicators used in it are examined in the works of such classics of controlling theory as T. Scone, H.J. Folmut, D. Khan, and others. Russian scientists have developed the concepts of the theory of controlling, supplemented and applied to Russian practice. Among the most well-known scientists who considered the issues of controlling investments should be mentioned M.N. and I.M. Pavlenkov, A.M. Karminsky, S.G. Falco and others. A significant contribution to the study of the controlling system in the agricultural sector was made by V.I. Barilenko, V.V. Berdnikov, O. Y. Havel et al. The founder of the application of the theory of tetrads in the study of economic systems is G.V. Kleiner, in applying

this theory to the controlling system, is justified by S.M. Bychkova, N.N. Makarova and E.A. Zhidkova.

The aim of our research is to study the system of controlling investments for Russian organizations operating in the agro-industrial sector.

II. MATERIALS AND METHODS (MODEL)

In the present study, we will look at identifying controlling investments from the point of view of tetrad theory in the context of a non-systemic approach to the study of economic phenomena. Based on the studies of domestic and foreign authors, we study various theoretical aspects of the organization of controlling investments, including a system of indicators used within its framework for analysis and control, and based on a study of statistical data, we draw conclusions about the specifics of investment activities of agricultural organizations in the Russian Federation.

The methodological basis of the research is general scientific and special methods of scientific research; abstract-logical research methods are used: methods of analysis and synthesis, classification and generalization, induction and deduction, statistical methods for analyzing economic phenomena, as well as tabular and graphical methods of statistical data.

III. RESULTS AND DISCUSSION

Any complex economic system can be considered within the framework of a systemic scientific approach as a combination of all elements, subsystems and communications between them, as well as processes ensuring the development of a given direction of the organization's functioning. From the standpoint of the neosystemic approach, various options are offered for considering the totality of such subsystems in accordance with various principles: it seems promising to consider economic phenomena from the standpoint of tetrad theory, within which complex systems operating during economic processes are proposed to be grouped into complexes of four subsystems of different types: object, environmental, process and project. Object systems are characterized by the presence of known boundaries of the system's location in space, but there is no definite time limit for functioning. For process systems, boundaries in time are known, but spatial boundaries are not defined. For design systems, both spatial and temporal boundaries are defined, and for environmental systems, both boundaries in space and in time are undefined [1].

In this regard, it is crucial to identify the place of controlling the investment. Speaking of investments, in the domestic scientific literature are often viewed as the concepts of the "innovation process" as a sequence of steps, actions and operations for the implementation of investment activities, and "innovation project" as a complex of interrelated technical, organizational and investment activities designed to achieve certain investment goals within a specified time with the established resource constraints [2]. However, A.M. Karminsky, considering investments from the point of view of controlling, considers them as an object [3] allocates

investments precisely as an object of controlling. In our opinion, it is advisable to agree with the last opinion. On the one hand, being undoubtedly a set of separate projects (like other subsystems within the controlling system), investments, however, are associated with the circulation of capital in its various forms and its constant transformation, which suggests that there are no time limits for this subsystem. On the other hand, the existing controlling tools applied to investments have clearly defined specifics, leaving other aspects of the enterprise's economic life out of its scope. Thus, we can assert that investments as a controlling subsystem have spatial limitations, which characterizes them as an object of controlling.

The main stages of controlling investments are to include planning and coordination of investment activities in the framework of strategic and operational planning, the initiation of new investment projects and the development of proposals for their implementation, the implementation of investments and project support, as well as control over the implementation of investment projects.

Current and long-term investment planning should be coordinated with strategic and operational financial planning in order to determine the optimal level of investment, allowing to maintain specified levels of liquidity and profitability, as well as to ensure sufficient funding for individual investment projects.

At the stage of search and evaluation of investment projects, the objectives of controlling the investments are [3]:

- creation of an investment planning system;
- formation of the concept of investment calculations and the definition of criteria for decision-making;
- establishing quality parameters that are crucial for investment calculations;
- carrying out detailed investment calculations for large projects;
- control over all investment projects and calculation of their effectiveness.

Assessment of investments should be carried out when buying new equipment or real estate, when choosing between renting and buying, between different options of actions, before acquiring companies, when investing capital in research and development, when investing temporarily free capital, and to evaluate proposals for streamlining existing technological processes aimed at reducing costs. All project appraisal methods use the concept of cash flows: money is invested in a project that will generate cash flows in the future.

Static and dynamic models for evaluating investments, as well as the use of scenario and mathematical models, usually act as instruments for controlling investments.

The scenario and mathematical models allow us to consider a wider range of investment project factors, scenarios, and evaluate the effect of changes on the components on the overall result of a project, for example, in the form of a sensitivity analysis.

If we talk about the system of indicators used in the system of controlling investments, then one of the most important among them is the rate of return on invested capital. The required level of this indicator is determined by the interest rate on absolutely reliable investments, the cost of capital of the organization, the risk level of the project and the level of profitability of the organization achieved to date [4].

Other important indicators are the calculation of project costs, its profits, the payback period of an investment project, the calculation of its net income, return on invested funds, as well as a simple and modified indicator of the project profitability rate.

The sensitivity analysis is used to check the reflection of changes in the various initial assumptions underlying the discounting of cash flows on the result. If a large percentage change in the initial value gives a small percentage change in the result, then the project is considered sustainable; otherwise, we are talking about the sensitivity of the project in relation to the parameter in question.

For vertically integrated holding companies, which include the largest Russian agricultural holdings, it is advisable to analyze the sensitivity of projects and assess the synergistic effect of project implementation on the company's value at all stages of their life cycle in the implementation of pre-selection and subsequent monitoring of investment decisions. At the same time, for each of the business segments, value creation drivers are identified and, based on the modeling of the impact of the implementation of project initiatives on the business value, the priority and critical scale of projects are determined [5].

The sensitivity analysis is closely related to sensitivity analysis, in which management personnel ascertain probabilities of outcomes, estimate the most probable, optimistic and pessimistic outcomes [4].

Let us consider in more detail the methods of calculating the costs of investment projects. It is about choosing among alternative investment projects the one that would require the lowest possible amount of current and capital costs. The current costs include personnel costs, including wages and social insurance costs, material costs, including expenses for basic and auxiliary materials, as well as transportation and storage costs, equipment maintenance costs, maintenance costs, energy, tools and equipment, etc. The capital costs in calculating the efficiency of investments include calculating depreciation and calculating interest on invested capital [6].

Calculation depreciation charges are spent on the acquisition of a new fixed asset instead of used. The amount of depreciation deductible included in the costs may not be enough if the purchase price of a new property rises compared to the price of a car at the time of the investment decision. Therefore, it is recommended that depreciation be included in the costs calculated on the basis of the cost of acquiring a new object. If an enterprise makes a decision to invest in production, it does not receive income in the form of interest, which could be obtained by investing in profitable financial instruments (for example, by placing it on a bank deposit).

Such lost income in investment calculations should be considered as costs.

To avoid erroneous investment decisions, well-organized investment planning is needed, coordinated with other types of enterprise planning, in particular, with its sales, production, and finance plans.

At the level of an individual organization, the criteria for selecting a specific investment project may be: growth in business value, increase in shareholder value added or target values of market multipliers, operational and investment development indicators, as well as improving the business reputation of the organization among the business community and potential stakeholders. At the level of the business segment, such criteria are primarily the elimination of "bottlenecks" in the value chain and reduction of operational risks, as well as an increase in operational efficiency indicators and the achievement of target values of residual income and return on investment [5].

To determine the profitability of investment objects, it is necessary to collect a number of internal and external data. Internal data include data on variable and fixed costs, income and expenses of the organization, its profitability, liquidity, generated cash flows and the presence of "bottlenecks", as well as labor productivity, market share and growth dynamics. External data includes information on market conditions, legislation, competitors' behavior, price dynamics, technological level, state of the environment, as well as on the dynamics of procurement, sales and capital markets, demand fluctuations, etc. [7].

If we talk about the feasibility of controlling investments in the branches of the agro-industrial sector, its active implementation can lead to the following results:

- increasing the internal transparency of the process of analytical substantiation and management decision-making by linear and functional management personnel of agricultural holdings;
- ensuring the continuity of business activities of individual structural units in their composition, as well as effective control over the use of state support funds received by them;
- a critical review of the product portfolios of agribusiness organizations, taking into account the state and prospects of creating new production capacity, focused on the assessment of key competencies, success factors and other parameters affecting the efficiency of production and sales of products, goods and services;
- delegation of large amounts of authority and responsibility for decisions made by subsidiary directorates to the level of functional and line managers [8].

At the same time, in addition to financial and economic information, organizational and technological (process), scientific, technical, environmental and social information, analysis and modeling of business processes using

benchmarking techniques are called basic principles for organizing controlling investments in this sector of the economy.

One of the main growth drivers in the agro-industrial sector is substantial budget support for agricultural producers: co-financing breeding, direct subsidies for production activities in emergency conditions, subsidizing interest rates on investment loans raised by agricultural producers for the implementation of modernization and innovative projects, etc. carried out using budget support funds. It implies the creation of a multi-level system of control over investment decisions. The implementation of preliminary and current control over the effectiveness and targeted use of allocated budget funds to compensate for the interest rate on investment loans is considered by us as a necessary control system.

Describing the conditions of investment in the agricultural sector of the Russian Federation, we consider the indicators characterizing the level of investment attractiveness of the industry (tab. 1). As follows from the table, over the past five years, agricultural production has been characterized by growth. At the same time, the indicator of the balanced financial result for the industry significantly increased (the difference between the profit in profitable organizations and the loss in loss-making ones).

TABLE I. INVESTMENT ATTRACTIVENESS OF AGRICULTURAL PRODUCTION INDUSTRIES IN THE RUSSIAN FEDERATION [9]

Indicator	Period				
	2013	2014	2015	2016	2017
The index of agricultural production, as a percentage of the corresponding period of the previous year	105,8	103,5	102,6	104,8	102,5
Balanced financial result of organizations, billion rubles	51,6	160,9	256,8	246,8	246,9
Number of profitable organizations, units	4851	4555	4214	4099	4318
Share of profitable organizations, %	69,6	72,4	75,9	76,7	74,6
The share of organizations that had overdue payables, %	22,2	20,5	17,3	14	12,4
Profitability of goods, products (works, services) sold, %	5,2	17,4	20,7	15,7	16,0
Return on assets, %	1,7	4,9	6,9	6	5,4

At the same time, a decrease in the number of profitable organizations in combination with their stable share in the total number of agricultural organizations (at the level of 70-75%) seems to characterize the tendency towards the consolidation of organizations in this sector of the economy. It is also noticeable that the profitability of the organizations of the sector in question over the past three years has reached a level significantly higher than the levels at the beginning of the year (the same can be said when considering the data for the ten-year period). Also, a reduction in the share of organizations with overdue payables is definitely positive. Thus, it can be said that the agricultural production sector in the Russian Federation has a noticeable potential in terms of investment attractiveness.

The data on investments in fixed capital in the sectors of agriculture, hunting and forestry in the Russian Federation presented in Table 2 indicate that over the past five years there has been a significant increase in the volume of fixed assets in these sectors, an increase in the rate of their renewal with a relatively stable ratio disposal, decreased the degree of depreciation of fixed assets, which allows us to speak about the efficiency of investment activities.

The volume of investment in fixed assets in these sectors and their share in the total investment in fixed assets in the Russian economy remained at a relatively constant level. At the same time, the structure of sources of financing for this type of investment has changed. If at the beginning of the study period, more than half of the investment of this type was financed from the sources involved, by the end of it, the largest share was made up of own funds. At the same time, it is necessary to note the decline in the share of investments made through a bank loan.

TABLE II. INVESTMENTS IN FIXED ASSETS IN BRANCHES OF AGRICULTURAL PRODUCTION OF THE RUSSIAN FEDERATION [9]

Indicator	Period				
	2013	2014	2015	2016	2017
Availability of fixed assets at the end of the year, billion rubles	3671,8	3909,0	4285,1	4758,4	5634,6
The rate of renewal of fixed assets, %	4,3	4,0	3,8	7,2	5,7
The retirement rate of fixed assets, %	2,1	1,8	2,1	2,5	1,9
The degree of depreciation of fixed assets at the end of the year, %	42,7	43,5	41,6	41,2	39,8
Investments in fixed assets, billion rubles	516,6	510,3	505,8	611,2	423,3
including at own expense, %	43,8	51,8	58,5	58	56,2
At the expense of the federal budget, %	3,0	3,9	2,3	2,3	1,1
At the expense of regional budgets, %	1,7	1,1	1,3	1,3	1,6
At the expense of local budgets, %	0,2	0,2	0,2	0,3	0,1
At the expense of bank loans, %	40,9	34,7	31,3	31,3	30,9
Share in total investment in the economy, %	3,8	3,7	3,6	4,2	3,4

As shown in Figure 1, the volume of financial investments, as well as the volume of investments in the fixed capital of organizations in the agricultural sector, has experienced marked growth over the past decade. At the same time, the growth of financial investments was noticeably more active and in 2015 their volume exceeded the volume of investments in fixed assets.

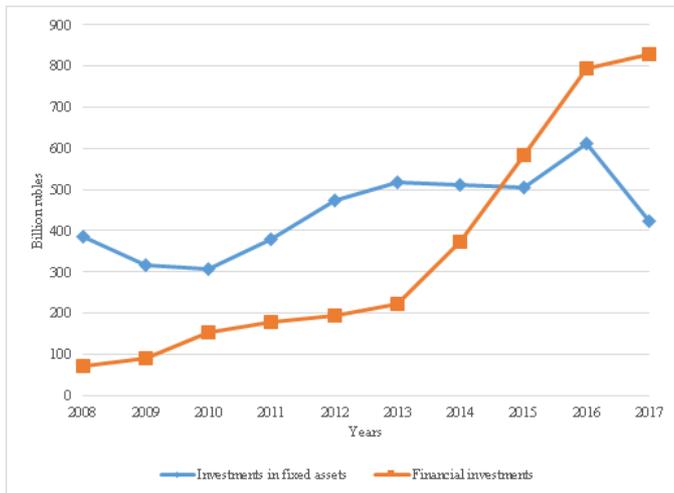


Fig. 1. Investment activity in the sectors of agriculture, hunting and forestry, billion rubles [9]

At the same time, in the structure of financial investments, as shown in Table 3, the largest share was made up of short-term investments; although both long-term and short-term financial investments demonstrated strong growth in the period under review, the volume of short-term investments increased at a significantly higher rate.

TABLE III. FINANCIAL INVESTMENTS IN BRANCHES OF AGRICULTURAL PRODUCTION OF THE RUSSIAN FEDERATION [9]

Indicator	Period				
	2013	2014	2015	2016	2017
Financial investments, total, billion rubles	222,6	374,1	582,6	792,5	828,1
Long-term financial investments, billion rubles	40,6	56,4	79,7	103,7	92,2
Short-term financial investments, billion rubles	182	317,7	502,9	688,8	735,9

The growth of organic and mineral fertilizer application indicators also proves the effectiveness of investments in the agricultural sector. If in 2008 the volume of applied mineral fertilizers was 1.9 million tons, with 36 kg per hectare of sown area and the volume of organic fertilizers - 51.3 million tons (1 ton per hectare), then in 2017 The volume of applied fertilizers increased to 2.5 million tons (55 kg per hectare), and organic fertilizers to 66 million tons (1.5 tons per hectare) [9]. Indicators of the availability of agricultural machinery, however, indicate a decrease in the number of agricultural machines. This, however, can speak not so much about the insufficient level of investment, as about a reduction in the need for a large number of agricultural equipment due to the increased productivity of its new designs due to more advanced technologies.

IV. CONCLUSION

Based on the above, based on the results of the study, a number of conclusions can be made. The first of these lies in the fact that, considering the issue of identifying the investment controlling subsystem within the organization controlling system, we define it as an object type subsystem that has spatial but no time constraints, and the investment is thus the object of controlling.

The tasks of the system of controlling the investments were defined, which include the tasks of developing a system of investment planning, coordinated with other types of planning at the enterprise, developing a system of analytical indicators characterizing the investment activity of the enterprise and criteria for making management decisions based on their application, directly making investment calculations in accordance with applied system of indicators, as well as monitoring investment activities of the organization ation and individual projects at all stages of their implementation.

As tools for controlling investments, we have identified static and dynamic models for evaluating investments, as well as the use of scenario and mathematical models. Among the most important indicators included in the system characterizing the organization's investment activity, we highlighted profitability of invested capital, cost of organization's capital, risk levels for individual projects, calculation of current and capital investment costs, payback period, net income for various projects, etc.

In organizations of the sector of the agro-industrial sector, the system of controlling investments has its own specifics related to the features of the product portfolio in the industry, the need to use organizational and technological, scientific, technical, environmental and social data in the accounting system and reporting, as well as the use of various forms of budget support that necessitate for the efficiency and targeted nature of the use of budget funds allocated to compensate for the interest rate on investment loans.

The study of state statistics data makes it possible to characterize the agricultural production industry as attractive from the point of view of investment due to the growth in the level of production, the balanced financial result for the industry and industry profitability indicators. At the same time, the growth of investments in fixed capital and financial investments testifies to the urgency of the tasks of creating a management and control system, which is the controlling system.

Acknowledgment

The study was carried out with the financial support of the Russian Foundation for Basic Research within the framework of the scientific project 18-010-01096 «Neo-system approach as a factor of scientific justification of transformation of the fundamentals of controlling of agribusiness organizations»

References

- [1] Kleiner G.B. *Ekonomika. Modelirovanie. Matematika. Izbrannye trudy.* [Economy. Modeling. Mathematics. Selected works.] Moscow: CEMI RAS, 2016, 856 p.
- [2] Alksavov D.S., Koshelev V.M. *Investitsionnyi analiz: Uchebnik D.S.* [Investment Analysis: a tutorial]. M.: Publishing House of the Russian State Agrarian University-Moscow Agricultural Academy, 2015. 327 p.
- [3] Karminsky A.M., Falco S.G., Zhevaga A.A., Ivanova N.Yu. *Kontrolling: uchebnik.* [Controlling: a tutorial]. - M.: PH «FORUM»: INFRA-M, 2013. - 336 p.
- [4] Scone T. *Upravlencheskii uchet* [Management Accounting] / Translation from English, ed. ND Eriashvili. - M: Audit, UNITI, 1997. - 179 p.
- [5] Gavel O.Y., Usanov A.Y., Sharikova I.V. *Montrolling investitsii v vertikal'nointegrirovannykh kompaniyakh apk: problemy i perspektivy* [Investment controlling in vertical-integrated AIC companies: problems and prospects]. *Agrarian Scientific Journal.* 2017. №. 4. pp. 80-85.
- [6] Falco S.G. *Kontrolling dlya rukovoditelei i spetsialistov* [Controlling for managers and specialists]. - M.: Finance and Statistics, 2008. - 272 p.
- [7] Folmouth H.Y. *Instrumenty kontrollinga ot A do Ya* [Controlling tools from A to Z]: Translated from German / Ed. and with foreword. M.L. Lukashevich and E.N. Tikhonenkova.-M.: Finance and Statistics, 2003. - 288 p.
- [8] Barilenko V.I., Berdnikov V.V., Havel O.Y., Kerimova C.V. *Analiticheskoe obosnovanie konkurentosposobnykh biznes-modelei* [Analytical rationale for competitive business models]. - M.: RUSINS, 2015. - 315 p.
- [9] *Federal'naya sluzhba gosudarstvennoi statistiki* [Federal State Statistics Service]. Available at: <http://www.gks.ru>. Reference date: 17.02.2019