

Synergetic Approach to The Formation of The Innovative Investment Policy of Enterprises in The Agro-Industrial Complex: Goal-Setting and Forecasting

Nadezhda Nikolaevna Makarova, Anna Vladimirovna Shokhnekh

Abstract: *The relevance of this study is due to the need to address the emerging scientific and methodological problems in the formation of innovation and investment policy of enterprises in the agro-industrial complex (AIC) related to the evolutionary transition to a new technological structure in the context of economic transformation. AIC enterprises have massive investment needs for the implementation of programs related to the introduction of innovative business processes. Innovation and investment policy is an essential element of the development strategy for AIC enterprises. The key findings of the study were obtained and substantiated using a synergistic approach to goal-setting and planning in AIC enterprises in relation to the innovative investment strategy in ensuring strategic economic security using the concept of channels and jokers. Decision-making in the development of innovation and investment policy based on improved capabilities in forecasting innovation and investment activities to achieve strategic goals will contribute to the economic security of AIC enterprises.*

Index Terms: *investment and innovation policy, enterprises of the agro-industrial complex, economic security, the concept of channels and jokers, goal-setting, forecasting, space.*

I. INTRODUCTION

Russia's transition to the new technological order (from the fourth-fifth to the sixth) is a strategic goal, and at the same time provides access to a fundamentally new level of government, society, economy, and business structures. Every previous order successfully solved the problem of greater "agricultural capacity utilization" of land areas and their extensive expansion. However, agricultural production cannot "fully fit" into the time intervals of technological orders. The agro-industrial complex (hereinafter – the AIC) operates in the context of the country's membership in the World Trade Organization and its increased integration within the Eurasian Economic Union, the intensification of import substitution under the "war of sanctions" caused by the current trends in world politics and economy. This

circumstance creates new opportunities and prospects for the development of innovation and investment activities of agricultural organizations, which, in turn, depend directly on the development of the overall economic situation of the state as a whole and the AIC in particular. Subject to predictable state policy, it is possible to develop and implement programs to support Russian innovators for the further development of agricultural production. Innovation and investment policy is an integral part of the state economic policy – an important driving force influencing the national economy and entrepreneurial activity of business entities.

The innovation and investment activities of AIC enterprises should be considered as activities related to investments in innovations (innovations are impossible without large investments, and effective investments are impossible without innovations). Depending on the subject and the scope, innovations in the AIC are classified into the following types: selection and genetic; technological and production; institutional, managerial and economic; social and environmental [1]. The potential of previous achievements is now virtually depleted. Therefore, the introduction of innovation in AIC enterprises as the result of scientific work, implemented in the form of a new product or technology, tends to cause an improvement (to increase yields, productivity, and efficiency of the object). At the same time, the size of investments in innovative developments is considered as one of the main tools for increasing the innovative activity of AIC enterprises. Therefore, investment and innovation activity in business structures of the AIC is a systematic and consistent process for the implementation of scientific research or other scientific and technological achievements, coupled with investment in innovation in agricultural production. It also involves the stimulation of investment activity of economic entities to ensure competitive advantages in the long term to achieve the strategic objectives. Given the importance of the investment component in the innovation process, it is worth considering the appropriateness of forming the innovation and investment policy for business structures of the AIC, which is crucial for their functioning. The correlation of innovation and investment processes causes the need to consider innovation and investment policy as a common direction of economic policy to ensure priority investment of implemented innovation projects.

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It is worth noticing that the innovation and investment policy is a multifaceted economic category since its presence is necessary at all levels of the economy. Thus, the innovation and investment policy in the AIC, the strategic goal of which is to achieve a specific level of socio-economic development of the regional AIC, serves as a necessary institutional basis of state support for investment activities in the AIC.

The innovation and investment component of economic security is the object of the impact of the innovation and investment policy on the development of AIC enterprises. The innovation and investment policy at the micro level is definitely a targeted activity that can qualitatively influence the changes in economic growth, the creation of favorable conditions for attracting investments, the dynamics of investment activity in a business entity and the introduction of innovative technologies. Therefore, the innovation and investment component of economic security, on the one hand, determines the starting conditions for the development of innovation and investment policy, and on the other hand, results from this policy.

II. METHODS

A. General description

The formation of innovation and investment policy, as well as the adoption of any administrative decision, should start with goal-setting to justify the means for achieving those goals. The need to define strategic goals when forming the innovation and investment policy reflects the increasing role of the long-term target development of the AIC enterprise. Therefore, particular attention should be paid to the goal-setting issues that determine the direction and principles of development for the innovative investment policy. The term "goal-setting" is legally established for the federal level and is defined as "determining baselines, objectives, and priorities for socio-economic development and ensuring the national security of the Russian Federation" [2]. This concept, with an adjustment to the micro level, can be used with the functional systems of goal-setting and forecasting in AIC enterprises regarding the innovation-investment strategy as the most important component of the innovation-investment policy. Its content needs to be coordinated with the general strategy of the economic entity, as well as associated with the formulation and achievement of certain goals. Thus, the development of innovative investment policy of AIC enterprises predetermines the dominant strategic approach built around the ideas of I. Ansoff [3].

B. Algorithm

The essence of the strategic approach is as follows. First, the external environment of AIC enterprises is no less, and in some cases even more important than the internal environment. The external environment of AIC enterprises is characterized by turbulence and volatility, incomplete information and poses risks and challenges. Therefore, the functional system of goal-setting and forecasting in the innovation-investment strategy of AIC enterprises is based on the assessment and forecast of the usefulness of the exogenous and endogenous factors considered in space and time interval, considering the preferences and interests of

decision-makers. All the possible chaotic solutions serve as an information base for creating alternative trajectories for innovation and investment development of dynamic AIC systems (a system of interacting units, which include the subsystems of innovative production and investment, that form a dynamic system [4]), which requires a synergistic approach.

III. RESULTS AND DISCUSSION

Today, modern synergetic has become the driving principle in scientific research. The authors' reference to synergetics is due to the need for an accurate problem statement, "synergetics ignores aimless objectives" [5, p. 9].

In accordance with the strategic goal setting, when following the path of innovation and investment process as an object and regularly making forecasts, one can notice that predictive systems can provide most effective and reliable forecasts. However, such predictive systems can occasionally make rough mistakes. Moreover, these effects of poor predictability should not be attributed to the use of computing technologies. Instead, they indicate behavioral characteristics of the object itself. To explain the effect of poor predictability, one can use the concept developing in the theory of dynamic systems, when any development is accompanied by a change of dynamic and chaotic stages. The concept of "channels" and "jokers" introduced by G.G. Malinetskii can serve as scientific evidence [6].

It should be noted that the well-known financier J. Soros is considered to be one of the authors of this concept [7]. According to the concept of channels and jokers, changes in the state of an object in time in the phase space are considered for forecasting purposes. In the channel area, only a few variables are established that are necessary both for describing the behavior of the system and for forecasting purposes. In synergetics, these most important variables are used as order parameters to characterize the channels. In the first approximation, the heuristic search cuts off all other factors as obviously unnecessary, and as a result, the system behaves predictably in the channel. At the same time, in the channel areas, the system is insensitive to changes in parameters and has a large horizon of forecasting of the system's future (Figure 1).

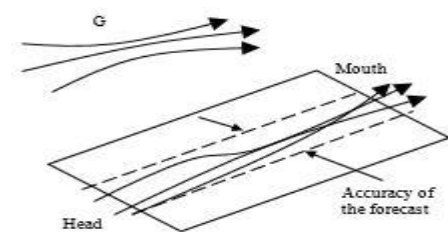


Fig. 1: The scheme of the channel occurrence [6, p. 303]

The description of the system can be obtained throughout the entire channel. Further, when the channel ends, it is no longer possible to obtain a deterministic forecast (only the random probabilistic behavior of the system is allowed).



The phase space contains bifurcation points (loss of stability) at which an insignificant cause can give rise to a new reality. According to the concept of channels and jokers, multiple real objects located in the phase space have joker areas J_k , able to jump the system from one point of phase space to another. The joker's function is to jump the system from one channel to another. For example, in a space G facing the trajectory of movement, there is a joker J_3 , which can lead to a change in space, where each of the variants can contain similar jokers (Figure 2).

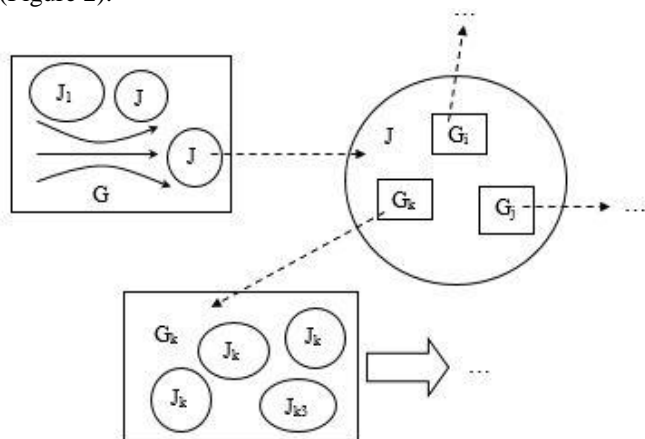


Fig. 2: The scheme of complex dynamics presented as a combination of channels and jokers

IV. CONCLUSION

The innovation and investment policy of AIC business structures is the pivotal basis of a promising strategy for their transition to innovative development and the most important tool for implementing the innovation and investment strategy of an economic entity.

The use of the concept of channels and jokers allows forming an innovation and investment development of a dynamic system (planning and calculating possible options, finding effective behavioral strategies). Moreover, the decisions that can change the vector trajectory of the system are made in the joker areas.

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