Digital accounting and management of economic processes in the agricultural sector

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Abstract. The paper considers the concept, pattern, methodology, models, standard, tools of digital (engineering) management of economic processes in the agricultural sector: the solvency of an agricultural enterprise, the financial condition of an agricultural enterprise, the reserve system and risk situations of agricultural enterprises. The enterprise standard “Organization of control of cash flows of an agricultural enterprise” is proposed.

1. Introduction

The digital evolution of accounting and control systems requires the use of more advanced digital (engineering) approaches, methods and mechanisms of an accounting and analytical nature, as well as computerization of accounting and control processes in order to ensure a synergistic effect from the coordinated work of all structural units of the enterprise. At the same time, the effectiveness of the activities of both individual structures and services, and the enterprise as a whole, is based on the prompt receipt of reliable and high-quality information by specialists of all levels of management for the rational use of all resources at the disposal of the organization and making relevant decisions in real time.

In Russia, the development of digital accounting technologies began more than 20 years ago at the scientific school of the honorary professor of Don State Technical University (DSTU) V.I. Tkach “System of engineering accounting and management at the micro level”, in the framework of which more than 100 certificates of state registration were developed and received in the established manner registration of computer programs, and also published more than 500 papers on the results of research.

Of particular importance for the implementation of Russia's development strategy until 2035 is the widespread adoption of digital technologies in commercial organizations of small and medium-sized businesses, since engineering methods provide increased competitiveness of the enterprise in all areas of its activity.

2. Materials and Methods

From the point of view of V.I. Tkach, the qualimetric characteristic of digital tools of economic, innovative and technological systems for managing the activities of agricultural enterprises is described by the following establishing positions that determine the differences between engineering methods of accounting and management from traditional ones:
- qualimetric engineering procedures;
- the use of algorithms and accounting digital iterations;
- digital mechanisms of double recording reflection;
- the use of fractals and aggregates of an economic type;
- integration based on an engineering chart of accounts;
- management of the virtual potential of the enterprise;
- assessment of the backup system of the enterprise;
- online risk management;
- online digital control;
- management of economic processes;
- solvency management;
- financial management;
- management of the organization’s property;
- determination of the zone of financial stability and security margins;
- the use of the concepts of synergism (effective activity) and anergism (inefficient activity) in management;
- improvement of the enterprise management apparatus based on the use of a logical chain of activity.

The economic processes of the enterprise under the conditions of using digital, engineering and network forms and methods were handled by many scientists who developed several dozen concepts, patterns, techniques, standards, modules, etc., which can be very effectively used also in agricultural enterprises [1, 2, 3, 4, 5, 6, 11, 13, 14, 19, 20].

In addition, from our point of view, the relevance of strategic accounting, analysis and audit in the management system of organizations of the agricultural sector of the economy has significantly increased, which is determined by the following positions.

1) A large volume of sales in the activities of enterprises of any direction will be information that has an extremely high cost.

2) In the decision-making process that leads to high efficiency, the strategic approach based on the use of strategic accounting data prevails.

3) A strategic analysis of the financial condition and effectiveness of management decisions made by the organization should be aimed, first of all, at identifying the influence of external factors, however, without ignoring the factors of the internal environment.

4) Strategic accounting and auditing, as well as analysis of the financial condition, should ensure the organization's adaptation to the external environment in order to avoid bankruptcy and inefficient use of resources.

5) Organized accounting, analysis and control of the activities of the enterprise operating in the agricultural sector should be oriented towards the time component, i.e. not only carried out in the past, present and future, but also in the context of temporal and territorial fractals.

6) A study of the organization and methodology of digital accounting, analysis and control of the activities of agricultural enterprises should be carried out on a systematic basis, taking into account the analysis of incoming and outgoing external information and providing feedback.

7) Organization of digital accounting and management of economic processes in agriculture is based on the use of structured work plans of accounts, which are closely linked with the internal structure of the organization and external areas of activity: strategic, operational and geographical segments, types of activities, directions of strategic activity, strategic responsibility centers, etc.

8) Organization of digital accounting and management of economic processes in agriculture should take into account risk factors: the scope of legislation, the area of administration of activity, the macroeconomic environment, the competitive environment, the sphere of politics and interstate agreements.

9) Digital accounting, analysis and control of economic processes in agriculture should be aimed at ensuring control over the use of competitive advantages.
10) Organization of digital accounting and management of economic processes in the agricultural sector should be based on the use of accounting engineering tools.

3. Results
As a result of the study of the possibilities of organizing digital accounting and managing economic processes at the agricultural enterprises, the following concepts, methodological principles and digital mechanisms were developed.

1. The concept of managing economic processes on the basis of an engineering chart of accounts provided an opportunity to study the problem from the point of view of economic entities of the agricultural sector (reserve system, financial condition, accounting engineering tools and obtained results) with a focus on ownership indicators: net assets in market value and net assets in fair value.

2. The pattern of research of solvency models of agricultural enterprises has focused the attention of theoreticians and practitioners on two systems of models:
   A) Finding models: coefficient systems, model systems, bankruptcy analysis, network model.
   B) Managerial models: immunization, mega-accounts.
   C) Digital mechanisms [11, 13, 14, 19, 20]

3. Methodologies for managing the solvency of an agricultural enterprise focused on the use of a system of accounting engineering tools in the enterprise management by type of accounting:
   I. Management accounting: solvency management.
   II. Network accounting:
      - solvency and reserve system management;
      - solvency management by type of activity.
   III. Strategic accounting for the activities of agricultural enterprises: strategic solvency management when entering new markets. [13, 17]

4. The general model of information support for cash flow management of an agricultural enterprise at the micro level includes a complex of aggregates:
   1) The purpose of management;
   2) Organizational structure;
   3) Analytical positions in accounting;
   4) The information base of network accounting: target accounting parameters; cash flow assessment: nominal, discounted, forecast; periodicity; accounting procedures.
   5) Used computer programs of accounting and control;
   6) Cash flow forecasting: direct and indirect forecasting.
   7) Cash flow control;
   8) Cash flow analysis;
   9) Mechanisms for determining the payment potential of the enterprise;
   10) The level of payment potential of the enterprise;
   11) Solvency zone;
   12) Multivariance of decisions;
   13) Assessment of the efficiency of payment potential;
   14) Making decisions in the field of cash flow management. [11, 19]

5. The accounting model of purchasing solvency of enterprises of the agricultural sector systematized them into 3 groups:
   1) Coefficient system:
      - coefficients characterizing the quality indicators of the solvency of the agricultural enterprise: current solvency; intermediate solvency; absolute solvency; industry solvency ratios.
      - solvency coefficients of the agricultural enterprise: the ratio of stocks to working capital; accounts receivable and payable; asset structure by liquidity; net working capital.
   2) The system of models: Altman; durations; Z model; Pankov and other models (banking, etc.).
3) The system of digital tools for accounting engineering: immunization mega-balance; backup mega-balance; hedged; integrated risk; immunization hedged derivative balance sheets. [19, 20]

6. The accounting model for monitoring the solvency of agricultural enterprises classified the solvency analysis system into two types:
   1) Discrete systems: the FFMS method; point systems; method for integrating assets and liabilities; general fund; scientific management; analytical financial table; discount mega-balance.
   2) Digital asset and liability management systems; asset and loan management; immunization mega-balance; digital mega-balance system. [11, 19, 20]

7. The enterprise standard “Organization of control of cash flows of the agricultural enterprise” emphasized control in 2 aspects:
   A) by type of activity;
      by external segments (geographical, consumer);
      by areas of strategic activity;
      by internal segments (operating);
      by responsibility centers.
   B) The state of the payment potential of the agricultural enterprise at the control date:
      active state: excess of cash inflows over outflows in terms of size, timing, interest rates, and risks;
      passive state: excess of cash outflows over inflows in terms of size, timing, interest rates, and risks;
      neutral state: equality of cash inflows and outflows in terms of size, timing, interest rates, and risks.
   The control method functioned on the basis of the cash flow mega-balance constructed by an algorithm of five iterations. [20]

8. In the project “Engineering system of accounting and solvency management of agricultural enterprises”, it is proposed to use the following digital mechanisms for accounting and solvency management:
   - general mega-balance of solvency;
   - immunization mega-balance for current activities;
   - immunization mega-balance for investment activities;
   - immunization mega-balance for financial activities;
   - immunization and hedged mega-balance;
   - zero immunization mega-balance;
   - synergetic mega-balance;
   - segmental immunization mega-balance.
   Based on these positions, the authors developed a blockchain system “Management of economic processes and performance of an agricultural enterprise” (Figure 1).
Figure 1. Blockchain system “Management of economic processes and performance of an agricultural enterprise”.

The blockchain system “Management of economic processes and performance of an agricultural enterprise” is formed by the following positions:

I. The potential of the agricultural enterprise and the main directions of its analysis and control: basic potential; management objects and processes (solvency, cash flows, logistic processes, financial condition, property); total potential; analysis; control; prescriptive solutions.

II. Digital tools (digital platform and several dozen computer programs).

III. Management of the economic processes of agricultural enterprises on the basis of the financial risk zone and security margin (active, passive, neutral).

The blockchain system is focused on managing aggregated (net assets in a market valuation) and disaggregated indicators of ownership of an agricultural enterprise (net liabilities).

The basic potential is characterized by four defining components:

1. Aggregated and disaggregated indicators of ownership (net assets and net liabilities).
2. Basic obligations of an agricultural enterprise.
3. Monitoring the potential of an agricultural enterprise.
4. Management of the financial risk zone of an agricultural enterprise (active, passive, neutral) (Figure 2).
4. Discussion
The blockchain system “Management of economic processes and performance of an agricultural enterprise” provides online management of financial key indicators, such as solvency; cash flows; economic situations; financial condition; property.

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