

Information platform - solution of digitalization of the public accounting system

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Abstract: *The article analyses the organization of the public accounting system in the context generated of the need for the transition to digital technology in the economy. Analyzed the essential and minimal conditions for the establishment of a digital accounting support information platform for public institutions. Analyzed the problems and solutions in the accounting digitalization of accounting of public institutions. The accounting system of Romania's public institutions requires to actively develop digital technology, which can lead to a qualitative revolution in the organization of management and administrative progress.*

Keywords: *accounting, algorithms, information technologies, audit, public institutions*

JEL Classification: *M41, L86*

Introduction

The digital technologies in the international economy started from the 1970s. Now, digitalization is actually carried out on a global measure, whether it is macro or micro.

At the national level, the electrical financial system has been put into use. As a consequence of the development and overview of digital technology have arisen new opportunities. In numerous cases, individuals and businesses can reply without an intermediary. The use of digital tools generally reduces the processing time of financial information and has a positive impact on improving the transparency of the use of public resources.

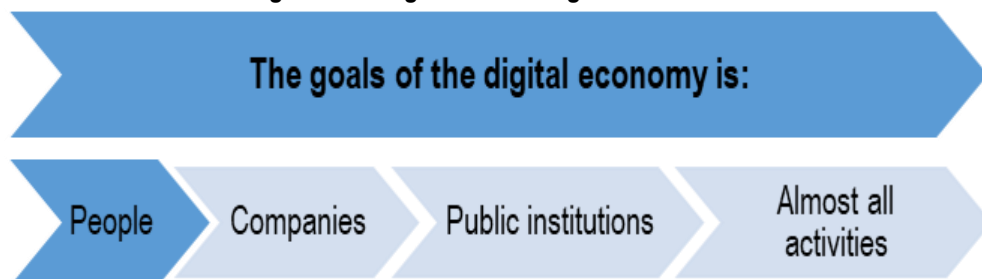
The integration of public institutions' financial information will integrate our country to the international community, which will surely open up new opportunities to provide new service quality provided by public institutions.

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All areas of activity are transformed by the digital revolution. In practice, concepts such as digital computing, accounting, auditing, and analysis are used, as well as concepts such as digital governance, digital state, or digital administration.

As can be seen in Figure 1, the goals of the digital economy are: people, companies, public institutions and almost all activities.

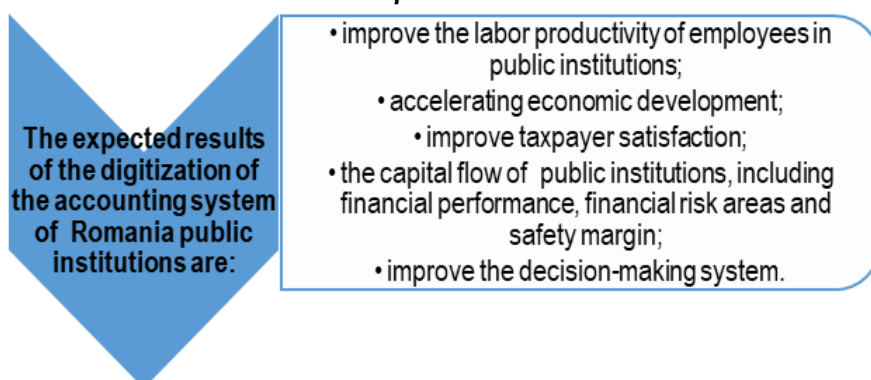
Figure 1. The goals of the digital revolution



Source: Author's own interpretation

Just like the industrial revolution in the past, many industries will experience extraordinary changes in the coming periods. The economic, social and geopolitical benefits will be huge. The expected results of the digitalization of the accounting system of Romania's public institutions are highlighted in Figure 2.

Figure 2. The expected results of digitalization on the accounting system of Romania public institutions



Source: Author's own interpretation

Literature and methodology

Many doctoral schools have participated in the creation of a system of digital accounting and managing. The methodical school representatives under the guidance of Tkach dynamically changed the designs of the theory of digitalization of the accounting system in public institutions, using digital accounting mathematical procedures, matrices, algorithms, focused on graphs, following plans for the engineering of accounts, aggregated accounting dealings, mega-accounts, merged financial statements. Researchers dynamically participating in this conceptual analysis include Kupenova (2020) and Mezentseva (2021). Other researchers that contributed to this field of research are Bogataya (2019) and Kroklicheva (2020). The digitalization of public accounting revolves around the following values and concentrations on the digital economy, as presented in Figure 3.

Figure 3. The digitization of the system of public accounting turns around the following principles, focusing on the digital economy

The digitization of the accounting system of public institutions is centered on the following principles, focused on the digital economy:

- the design of a digital platform and the operation of digital technologies equipped with a complex of digital mechanisms in the form of a system of megabalances;
- design of engineering tools that ensure the management of capital of all types; management of economic situations and aggregated resource flows;
- the formation of an accounting monograph, in which economic aggregates are mega-accounts, a permanent record and a distributed ledger;
- the use of aggregated accounting records focused on property indicators; definition of a three-level security margin (active, neutral, passive) for the purpose of managing the back-up system;
- emphasis on determining the outcome of activities with a capital management system of all kinds;
- a generalized indicator of the organization's activity, synergy or anergism, focused on the use of all types of capital.

Source: Author's own interpretation

The digitalization of account information machinery platform, made on the substance of the engineering plan of accounts, will be epitomized by the following elements:

- a structure of mega calculations, alpha numeric adaptability,
- a structure of algorithms (architectures, counters, first and last operatives, a set of repetitions, consolidate accounting inputs).

It will promise the efficient running of municipal institutions by essentially changing the accounting, management and analysis system.

Micro-accounting information platform for public institutions

For encouraging the progress of a digitalization of the accounting system in public institutions at national level, it is essential to create basic conditions, as underlined in Figure 4.

Figure 4. The basic conditions it is required for the encouraging progress of a digitalization of the accounting system in public institutions at national level

The basic conditions it is required for the encouraging progress of a digitalization of the accounting system in public institutions at national level:	- the existence of a super-competitive environment of IT service providers;
	- information infrastructure of public institutions;
	- environment conducive to the development of digital technology and platforms;
	- cybersecurity;
	- the regulatory framework;
	- personnel

Source: Author's own interpretation

According to experts, the accounting system in public institutions in Romania is at the highest of digital growth. The obligation for moving towards a digital technological system in Romania has been established for the Authority for the Digitalization of Romania (ADT), within the Ministry of Communication, Innovation and Digitalization. ADT's role is to carry out and coordinate the implementation of strategies and public policies in the field of digital transformation. Romania has all the openings for the quick implementation of fifth generation data systems because Romanian academics have created a significant reserve in this ground.

Tkach pioneered the research in the field of "Engineering Accounting and management at the micro level". According to Becker and Huselid (1998), digital platforms, cloud computing and algorithms play an important role in the transformation of social and economic individualities. The digital economy is a significant design space. It aims to accomplish sustainable economic evolution of gross domestic ideas at the macro and micro-levels, and to consider the use of intellectual properties on a global scale.

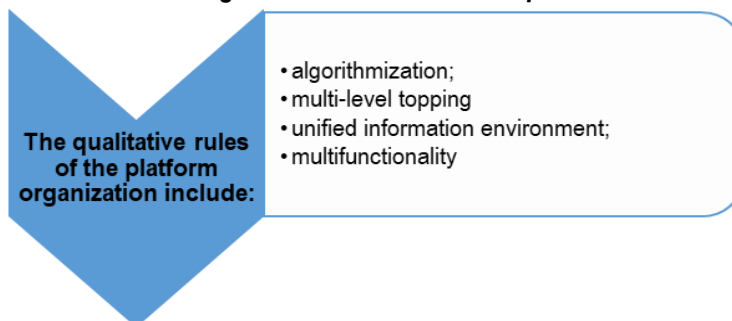
According to the current progress in the field of information technology, economy and administration, digital systems have the mission to connect the financial information of public institutions, to manage the public resources and to organize control, to merge their roles and to contribute to the conversion of the system of public accounting institutions, starting with the level of management and systematic maintenance, to the financial management account level. The leading role of the digital economy is to form a digital platform for individual types of activities, which means, as a whole, it is a certain kind of information technology, which contains management procedures. Digital tools and platforms created on engineering tools provide real-time optimization solutions (efficacy, efficiency, erogeneity and sustainability) from a multi-level perspective in any field.

A digital platform is an assemblage of digital information (logical information's), models and tools (devices), which are incorporated into a single functional mechanical system in terms of information and technology, aiming to conduct qualified management of labelling topic through the interaction of organizational stakeholder (Bogataya and Evstafyeva, 2019).

Digital accounting information platform at the public institutions level, has multiple sets of intelligent IT systems, through system integration for conceptual combination. The change of this scientific paradigm lies in the fact that it is based on the digital tools in the design framework system, algorithmic solutions, the use of accounting totals, accumulated investment, and the account entity established on a diversified basis. It has established a basic new line in the expansion of innovative accounting and, of course, hierarchical structure, innovative secondary balance sheet, diagnosis and qualitative evaluation. The scientific method in the picture allows the organization of the projects according to their individuality and the construction of accounting and administration systems to understand the desires of economic reality (Cioban, Hlaciuc, Zaicéanu, 2015).

Qualitative rules of the platform's organization are illustrated in Figure 5.

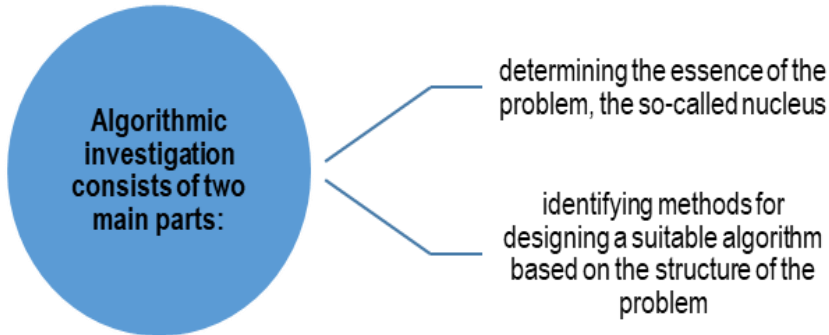
Figure 5. Qualitative rules of platforms



Source: Author's own interpretation

The basis of building the platform is the algorithm. The algorithmic processes for the communication of platform contributors are determined and executed within the conventional algorithm. The great number of these interaction processes is limited. Algorithms are used in all fields of activity every time because they generate system order, which is essential in the economy.

Figure 6. Algorithmic investigation

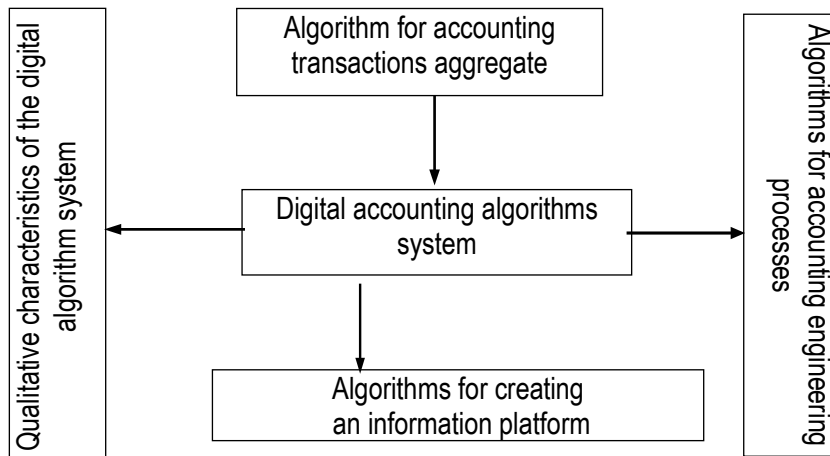


Source: Author's own interpretation

According to Figure 6, algorithmic investigation consists of two parts: determining the core of the problem, the so-called nucleus, and defining the method of design algorithms that fit the problem structure.

The digital engineering algorithms system is presented in Figure 7.

Figure 7. The digital engineering algorithms system

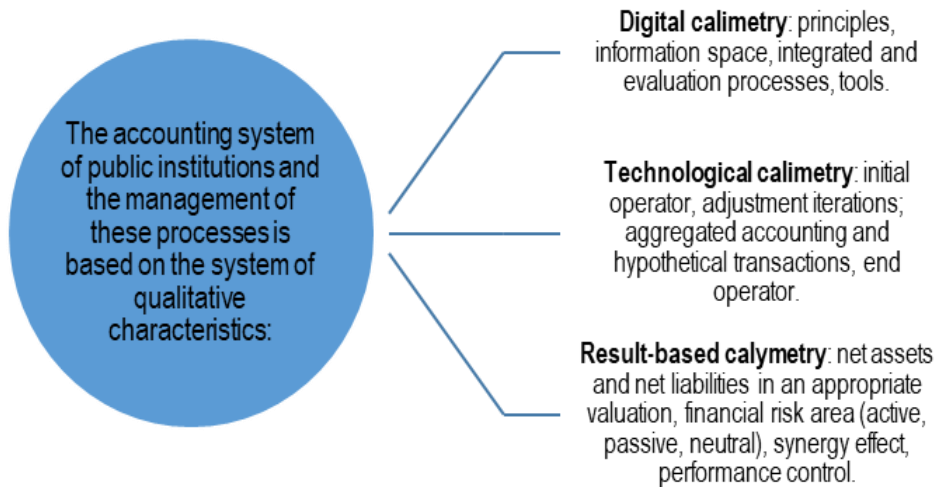


Source: Author's own interpretation

These parts are interdependent. When used with concentrated efficiency, algorithmic concepts not only deliver solutions to clearly defined difficulties, but also form a language to clearly express potential problems.

This is the specification of information treating and final data gathering (initial operator, stages and final dates), gross resources in market valuation and net accountabilities in fair value, fiscal risk areas (assets, liabilities), margin of safety and synergy sequence public institutions and their structural departments. Using the digital algorithms in the arena of account, controlling and analysis has the characteristics of a variety of processes.

Figure 8. Qualitative characteristics of system of public accounting



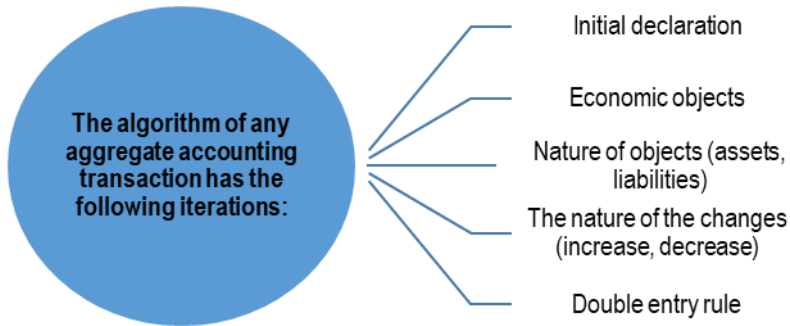
Source: Author's own interpretation

According to Figure 8, qualitative characteristics of the system of public accounting are:

- digital calimetry
- technological calimetry
- result-based calimetry

The algorithm of any summative accounting transaction, has the succeeding iterations, according Figure 9.

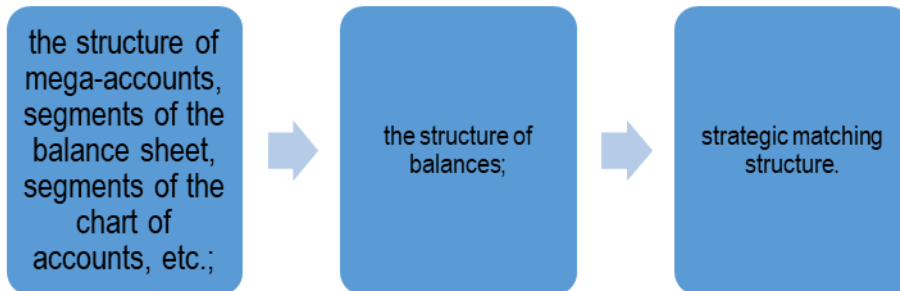
Figure 9. Qualitative characteristics of system of public accounting



Source: Author's own interpretation

The primary operator of the digital algorithm is illustrated in Figure 10.

Figure 10. The primary operator of the digital algorithm



Source: Author's own interpretation

The algorithm of accumulated accounting relations consists of a sequence of steps, according to Figure 11.

Figure 11. Steps of the algorithm of accumulated accounting relations

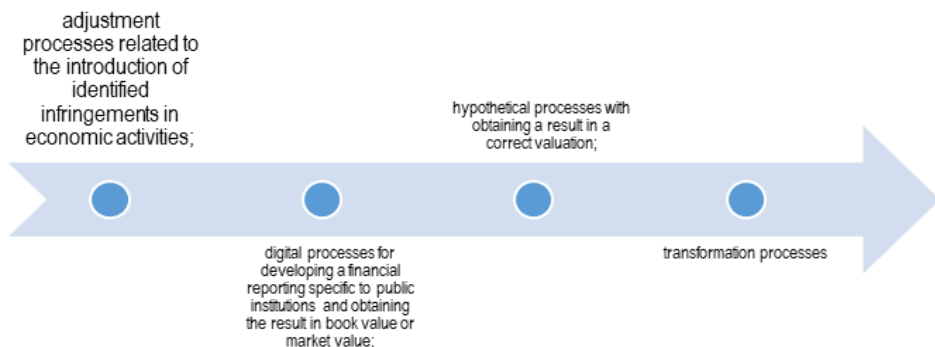
The algorithm of aggregated accounting transactions is determined by the following steps:

- the economic situation and its assessment;
- iterations of the aggregated transaction (depending on the original operator used);
- aggregated transaction (double entry rule);
- the technical characteristics of an algorithmic program (computer type, computer, programming language, operating environment;
- digital platform;
- patent or certificate of registration of a computer program, digital accounting tools);
- profit result: net assets and net liabilities;
- control system: zero accounting and control errors, table of indicators connecting etc.

Source: Author's own interpretation.

The accounting engineering process algorithm includes the following components (Figure 12).

Figure 12. The accounting engineering process algorithm



Source: Author's own interpretation

Therefore, the digital accounting algorithms have technical characteristics, such as:

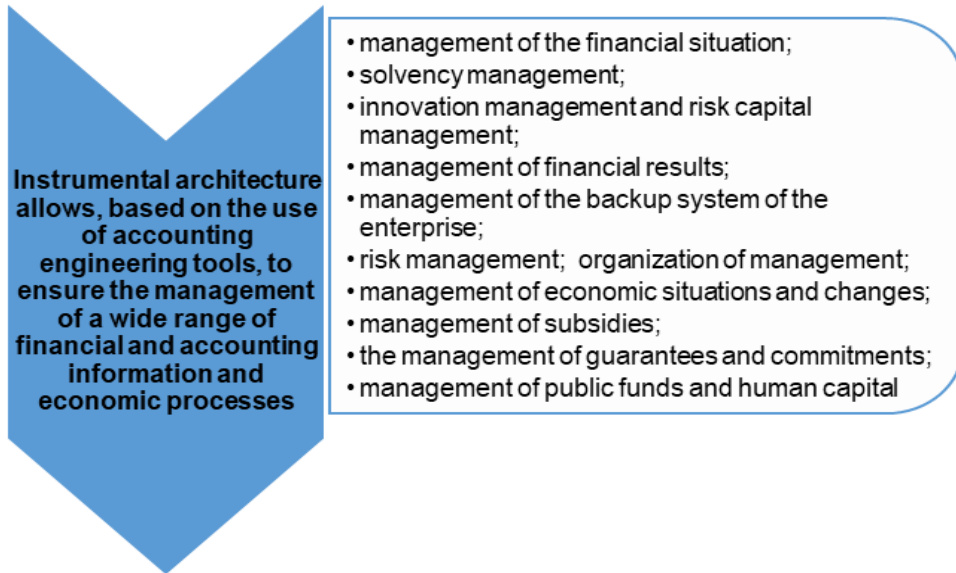
- design;

- measuring system;
- the configuration of the initial and final operators;
- iterative system;
- aggregated accounting operations.

The fast growth of digital systems in the economy at the international and national levels has completely changed the role of accounting and given it the function of managing the management process of public institutions. The digitalization mechanism of the system of public accounting is created on innovative modern procedures, considered by a complex algorithm model and a set of secondary objectives activated according to a set of tasks. The practice of digital technology in the system of public accounting simultaneously allows financial, management, fiscal, tactical, transactional and other forms of accounting. The regulator of the system recognized with the help of digital tools, and interconnection of all transactions based on the financial structures, can increase the transparency of use while reducing public funds due to unpredictable changes generated by COVID-19.

The construction of a micro-level digital accounting platform starts with the design of the accounting process in a public institution. The accounting structure is designed to perform its functions and adjust the data in different ways (financial, managing, transaction). The data is provided by the accounting public analysis institutions and manages various conditions in the decision-making process.

The basis of creating a structural chart of accounts, the chart of accounts of building structures, the overall and combined selection of the first and the last operators of accounting and computer engineering management programs are created on a set of design programs at the level of the structured architecture compartment. The design in the assimilated architecture is responsible for ensuring accounting is supported by activity type, cost center, responsibility centers. Planning at the overall structure level involves the explanation of accounting totals, the formation of economically united accounting records, the design of indicator definitions in the form of aggregated and decomposed indicators of market ownership, and real valuation. The logic of accounting and control behavior, a method of generating accounting results and management, with the formulas, sequence conditions, and relationships that control the accuracy of final results are created in the engineering algorithmic architecture stage, which includes a set of mathematics that will be effective. The basic reference data (initial operators) is converted into the required result (final operators) to reliable rules in a limited number of iterations, as well as the corresponding database, laws and tax regulations and computer programs.

Figure 12. Instrumental architecture

Source: Author's own interpretation

The necessity of algorithmic architecture designed all the situations that may occur in the accounting and analysis support and management process of economic and financial processes in public institutions. The characteristics of the algorithm architecture are a series of mandatory attributes: inevitability, individuality, effectiveness, linguistic unity, group characteristics. Tool architecture engineering describes a set of necessary mechanisms of accounting engineering that provides integrated management and strategic account.

According to Figure 12, the tool architecture allows the use of accounting-based engineering tools to ensure the management of a wide range of financial and accounting information and economic processes.

The design of the qualitative control is constructed on the transformation from qualitative indicators to quantitative indicators. The control methods used are determined through discourse, tools, finality, management and comparison. The complexity of control methods used can be divided into three groups: traditional, engineering and digital.

Traditional control procedures include checklist systems (list of resources and responsibilities); link tables (relationships of report indicators, general registration tables, analysis tables, etc.); and accounting boundaries. Technical control methods should include a specialized secondary balance sheets system. Digital control methods include specialized

control programs and network methods: statistical, simulation, hierarchical, evolutionary calculations, etc.

The basic assumptions of architecture, its laws, requirements and consequences allow its use in the modeling of digital accounting, analysis and audit systems, including:

- different accounting management processes adapted to economic processes;
- consider the possibility of costs associated with adaptation;
- application of computer programs and databases in the accounting process;
- create a single information field for accounting and management;
- use of real-time information flows;
- extensive use of integrated transaction and engineering accounting procedures;
- formulate structured accounting monograph;
- identify risk areas;
- accounting management, financial and economic flows particular to public institutions.

According to Daily, the ability to create budgets, consider and create effective management accounting systems using a structured chart of accounts. Therefore, the engineering-architectural design solutions system lays the foundation for the construction of a structured digital account plan, which is used as an information accounting platform. Paliy stated that accounts and a monograph of accounts are the foundation of any computer system.]

An important parameter of the structured chart of accounts that determines its functions and advantages is the size, that is, the number of meters embedded in the work chart of accounts at the design stage. Only two competences have been used in the world, and we have known since the occurrence of double recording-this is time and evaluation. With the development of the accounting system, the number of indicators that formed the basis of the chart of accounts has increased significantly, and the informational content of accounting data also increased. Indicators such as facts, situations, events, time scores, and product value creation points have emerged, and the chart of accounts maintains an organic unit and provides an opportunity to obtain immediate analysis information about the organization. As an engineering accounting tool, the structured chart of accounts can be configured for specific accounting methods for financial results – assessment method, cash method, and modification method.

The structure of the account is designed using one of the following three parameters: production, finance, or professional. In architectural structure diagram of accounting and accounting systems, the choice of accounting optics depends on several situations:

- priorities for the development of public institutions;

- guide the country's economic development to interests of certain market participant groups; the accounting system is oriented to individual indicators (Tkach, 2019).

The main conceptual differences between the digital chart of accounts and the traditional chart of accounts are as follows:

- structured chart of accounts;
- algorithm engineering, instrument engineering and qualitative control;
- closely integrated with the corporate organizational structure;
- the core of the chart of accounts, the summary account, which allows the management of complex economic processes and indicators;
- real-time process of an unlimited number of accounting mechanism;
- multi-function management, multi-level management;
- economic processes management;
- summary of financial, budgetary, management and other accounts, operating on the basis of economic aggregates, 'embedded' in a structured account table.

Conclusions

The structured work plan of the account allows the reliable organization of solutions for the most complex and non-standard accounting and management tasks reliably at the best time. Timely access to reliable information required for accounting analysis, control and management, as well as the preparation of the accounting analysis indicators for calibration can make correct, verified and reasonable management decisions on the management of the public institutions and its property in order to avoid risks.

The structured work plan of the account structure makes it possible to organize real-time accounting at different levels: by responsibility and cost center, by economic factor, by activity type, by situations and events, by temporary fractals, by economic activity, by strategic activity area, from external and internal divisions from a functional perspective.

The use of digital platforms in the system of public accounting allows management to focus on indicators that were previously undetectable, but remains important in assessing the efficiency of the use of public funds:

- properly estimated net liabilities;
- financial risk field;
- prediction of the outcome of the activity.

It can be concluded that the basis of the system of public accounting digitization, its ability to provide all the necessary information to interested users in real time, is a digital accounting algorithm system. Future research directions could be related to further active development of the problem, and the development of further integration mechanisms, which will make

analysis tools more integrated and easier for users, while meeting existing analysis needs that will emerge in the near future. This problem can also be solved by using the digital accounting framework.

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