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2022 12th International Conference on

ADVANCED COMPUTER INFORMATION TECHNOLOGIES ACIT'2022

Conference Proceedings

Spišská Kapitula, Slovakia
26-28 September 2022

2022 12th International Conference on Advanced Computer Information Technologies

ACIT'2022

Organized by:

West Ukrainian National University, Ukraine
Catholic University in Ružomberok, Slovakia
University of South Bohemia, Czech Republic
Deggendorf Institute of Technology, Germany
Wroclaw University of Economics and Business, Poland
Czechoslovakia Section of IEEE / Computer (c) Society Chapter

IEEE Catalog Numbers
ISBN: 978-1-6654-1050-2
ISSN: 2770-5226
Part Number: CFP22S92-ART

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Honorable scientists, participants of the 2022 12th International Conference "Advanced Computer Information Technologies" ACIT'2022!

Modern information technologies today have a decisive influence on the changes taking place in the world. People are surrounded by networks through which a large flow of information constantly passes, whether we realize it or not. Our ideas about the world are changing because it is becoming globalized. Distance ceases to be an obstacle for both commercial and social contacts. The infrastructure of information and communication technologies permeates our lives.

IT technologies do not just exist in a vacuum, but influence society, and society affects it.

The development of the IT sphere brings the world together, and we all become a single independent system, overcoming the barriers of language and geographical borders.

The IT sector is currently undergoing major changes thanks to the development and practical implementation of the latest technologies. A pleasant trend is that Ukraine is taking powerful steps in the development of the industry and is moving in the right direction.

It is gratifying that this year the conference brought together scientists from more than 40 countries: Austria, Belarus, Botswana, Brazil, Bulgaria, Canada, Chech Republik, China, Cyprus, Czech Republic, Egypt, Estonia, France, Germany, India, Indonezia, Italy, Kazachstan, Kenya, Latvia, Lebanon, Lithuanian, Moldova, Namibia, Nigeria, Norway, Papua New Guinea, Poland, Romania, Rwanda, Serbia, Slovakia, Slovenia, South Africa, Taiwan, Tunis, Turkey, Ukraine, Uzbekistan.

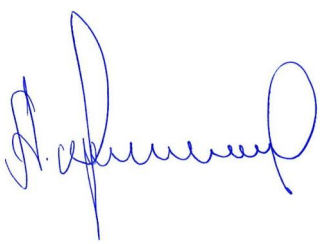
The 12th ACIT'2022 International Conference is organized by the West Ukrainian National University (Ukraine) together with the Catholic University in Ružomberok (Slovakia), the University of South Bohemia (Czech Republic), the Deggendorf Institute of Technology (Germany), and the Wroclaw University of Economics and Business (Poland).

I am sure that during the work of the conference there will be constructive dialogue, lively discussions, new ideas and approaches to overcoming today's challenges will be born. I hope that such cooperation will deepen and improve, acquiring new meaning. This meeting of representatives of the scientific elite will be a solid foundation for in-depth cooperation and integration of Ukraine into the world scientific community.

I wish you good health, creative effort in conquering new peaks of computer science, tireless search, interesting discoveries and realization of ideas.

Sincerely yours,

Andriy Krysovatyy
Rector of West Ukrainian National University



Message from ACIT'2022 Co-Chairmen

Dear participants of the "2022 12th International Conference on Advanced Computer Information Technologies" ACIT'2022!

The first annual All-Ukrainian School-Workshop for Young Scientists and Students "Advanced Computer Information Technologies" was held in May 2011. It was organized by the Faculty of Computer Information Technologies (Ternopil National Economic University, Ukraine), the Association of Computer Information Technologies Specialists and the Council of Young Scientists of TNEU. In 2017, the 7th ACIT'2017 has firstly became International Conference.

Last year, ACIT'2021 is made possible through collaboration of Faculty of Computer Information Technologies (West Ukrainian National University, Ukraine), Institute of Applied Informatics (Deggendorf Institute of Technology, Germany), Institute of Applied Informatics (University of South Bohemia, Czech Republic) and IEEE Germany Section/Communications Society German Chapter (COM19). ACIT'2021 was host by our partner – Institute of Applied Informatics of Deggendorf Institute of Technology. Scientists from 44 different countries submitted the papers for participation in the 11th International Conference ACIT'2021. Due to emergency circumstances, the ACIT'2021 conference was taken in virtual mode.

The 2022 12th International Conference on Advanced Computer Information Technologies (ACIT'2022) organized by the West Ukrainian National University (Ukraine), Catholic University in Ružomberok (Slovakia), University of South Bohemia (Czech Republic), Deggendorf Institute of Technology (Germany), Wroclaw University of Economics and Business (Poland). Technical support is offered by Czechoslovakia Section of IEEE / Computer (C) Society Chapter. Scientists from more than 40 different countries submitted the applications for participation in the 12th International Conference ACIT'2022.

The topics for the 2022 12th International Conference on Advanced Computer Information Technologies conference include: Computational Intelligence and Mathematical Modelling; Cyber Security; Specialized Information and Computer Systems; Artificial Intelligence and Cognitive Systems; Information in Economy and Management; Information Technology in Education.

We would like to sincerely thank to all of the reviewers of more than 240 submitted papers. Their names are listed in the conference proceedings. Almost second of submitted papers has been rejected. In totally 122 articles has been accepted. ACIT'2022 will be held in Spišská Kapitula, Slovakia. ACIT'2022 will be hosted by the by our partner - Catholic University in Ružomberok. We hope that the spirit of the ACIT'2022 International Conference will be present at the plenary and sectional meetings and will ensure a high level of scientific discussions.

Dear participants! We wish you to have productive discussions and hope that the conference will give you good inspiration for further developments in the field of Advanced Computer and Information Technologies!

Best regards,
Mykola Dyvak, Rudolf Volner, Libor Dostalek, Wolfgang Dorner and Artur Rot.

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Information Support of Social Audit

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Abstract—The process of decision making based on analytical information in social audit is described in this paper. Possibility of data-driven models using during decision making on different levels of management is considered. Analysis of the mechanisms of formation and use of information support provides an opportunity to optimize the processes of collection, processing, storage and use of information in various areas, in particular in social audit. To improve the order of formation of information support of social audit, information requests at different levels of government are analyzed: global; macro levels; meso levels; micro level, which includes strategic, tactical and operational sublevels. The conceptual model of information support of social audit developed on this basis, with the description of its tasks, functions, components and the order of formation of information base, provides reception of the full and reliable information necessary for acceptance of the corresponding administrative decisions of a social direction.

Keywords— decision making, information support, social audit, control, organization, social accounting, state control, staff motivation, concept of social audit

I. Introduction

Today, in economic and social activities, the role of information technologies, which include information as one of the main components, is strategic - to facilitate management, adequately respond to market dynamics, maintain and deepen competitive advantage in order to achieve maximum benefit. Information support is a key factor in decision-making process. Scientists describe information support as an integrated system of knowledge about the object, which provides all types and forms of knowledge use and combines a set of methods and tools of a single system of organization and storage, accumulation and updating, access and retrieval, processing and use of production information. Information support is a system of qualitative and quantitative indicators that characterize the level of satisfaction of management entities with managerial information and information technology so that this system could realize set goals and objectives [1]. In [2] information support defined as a combination of document forms, regulatory framework and implemented decisions on the volume, location and forms of information organization within the system of automated processing of economic information or in the informational system.

Other authors interpret this concept as follows:

information support is a set of processes of preparation and supply of specially prepared information for solving managerial, scientific, technical and other tasks in accordance with the stages of their solution ;

information support is a set of methods, ways of running documentation, factual and conceptual services used to meet information needs in particular scientific and technical situation or to solve managerial problems [3];

information management is the organization of meaningful information arrays comprising collection, storage, processing and transmission of information (including software use) in order to analyze obtained results for preparation, justification and taking managerial decisions [2] .

Considering the views of the above mentioned authors, we can identify three approaches to the definition of “information support”:

1) information support as a set of measures and procedures contributing to the functioning of the information system;

2) information support as a set of tools, methods and ways to search, obtain, document, process, encode, transmit and store information about the state and dynamics of objects and enterprise management system;

3) information support is a process of meeting the needs of information users.

Thus, to define the concept of “information support” all mentioned approaches must be taken into account.

Considering scientific opinions and indicated shortcomings in the definition of the social audit information support, we can obtain the following definition: information support of social audit is interconnected set of audit information created in accordance with the needs of social audit entities, as well as technologies, tools and measures aimed at the effective functioning of the social audit system at the enterprise.

II. Purpose of Research

The purpose of this paper is to give the essential characteristics of the concept of information support of social audit and determine its theoretical foundations (subject, purpose, functions). Improve the process of conducting socially oriented audit using the model of its information support developed in accordance with user requests.

III. Concept of Social Audit Information Support

An important place in determining the theoretical fundamentals of information support of the social audit system at the enterprise is understanding that such information support makes up the basis of enterprise management due to

purpose to inform all officials about the state of economic activity of the enterprise [3].

Thus, it is possible to define the main purpose of social audit information support. It consists in providing quality information to the subjects of social audit for effective performance of their functions.

Objective realization of social audit information support is carried out when the following basic tasks are fulfilled:

ensuring compliance of the quality, content and amount of the given information with the requirements of social audit entities;

timely formation and transfer of information to the subjects of the social audit;

ensuring the use of standard methods and ways of accumulation, selecting, processing and transmission of audit information by all subjects of information support of social audit;

ensuring communication between the subjects of information support of social audit and the subjects of social audit.

According to the scientific sources, the principles of information support of social audit are the basic rules, requirements, provisions to be observed during the formation and operation of information support of social audit [4].

Based on the studies of general scientific principles, principles of information support, the following principles of information support of the social audit are singled out (see Table I).

The principles of formation of information support include the following: the principle of systemacy, the principle of information adequacy, the principle of development (openness), the principle of standardization and unification, the principle of efficiency, the principle of data security, the principle of reliability, the principle of productivity, the principle of adaptation, the principle of privacy for rational accumulation, processing and publication of social information.

TABLE I. PRINCIPLES OF FORMATION OF SOCIAL AUDIT INFORMATION SUPPORT

Principle	Characteristic of the principle
The principle of systematization.	The links between the structural elements of information support should ensure the compatibility and interaction of all elements of IS (information support), i.e. considered as a whole.
The principle of adequacy of information	Each private model should use only known information (regulatory, reference, forecast) with the required accuracy.
The principle of development (openness)	The information support should be able to expand and update objects and elements of their description.
The principle of standardization and unification	When creating information support, typical, standardized elements should be used in order to unify techniques, methods and instructions for information processing.
The principle of efficiency	Achieving a rational relationship between the costs of creating information support and the final result.
The principle of data security	Information must be protected from unauthorized access, any violation must be detected.
the principle of reliability	Information must be accurate, accessible and timely.
The principle of productivity	Strict requirements to terms of processing and efficiency of information.
The principle of adaptation	Information support must be fit for modification and extension, even if the system is completely modified information must be preserved.
The principle of privacy	Accounting and control over the spread of information among external users, as well as the content and nature of reporting information, i.e. providing users with only information that can not cause the company losses from competitors.

Source: compiled by the authors according to the sources [2, 3,5,6].

Having considered other scientific works, we have compiled a list of requirements to meet the information support of social audit for effective managerial decisions (see Table II).

TABLE II. REQUIREMENTS TO INFORMATION SUPPORT OF SOCIAL AUDIT

Nr	Requirements	Requirement in the process of production management
1	Significance	Only information that has a direct impact on the audit process and appropriate management decisions is selected.
2	Completeness	The amount of information should be sufficient to access the situation and make decisions at a certain level in management.
3	Accessibility	Information submission is clear and understandable for the user to make a decision without fear of making mistakes. The reporting forms should reflect the content of the issues, be clear, without undue detail.
4	Timeliness	Correspondence of the generated information to the period of its use, i.e. satisfaction of needs of its users at the necessary moment or till the certain term for the purpose of development of administrative decisions.
5	Stability	The structure of information support is justified from the standpoint of necessity and sufficiency to perform social and audit tasks
6	Precision	The data must be unambiguous and not involve different interpretations.
7	Periodicity	Timely periodic information supply to the relevant structural unit or to a certain employee.
8	Certainty	Informational support must adequately reflect the real state of labor accounting and its payment and be confirmed by accounting documents.
9	Value	Informational support must provide an opportunity to assess results and forecast development prospects.
10	Comparability	Ability to compare production indicators over time, with similar indicators of other enterprises. This is provided by the use of appropriate data processing techniques, reporting deadlines, national and international accounting and reporting standards.
11	Efficiency	The costs of collecting and processing information should not exceed the useful effect of its use in the preparation and implementation of appropriate management decisions.
12	Intelligibility	Information arrays are determined by the simplicity of construction, compliance with presentation standards and comprehensibility to the users for whom it is intended.
13	Compatibility	Information support must be compatible with the information support of the system that interact with it, in terms of content, coding system, addressing methods, data formats and the form of presentation of information that enters and leaves the system.

Source: compiled by the authors on the basis of [7,8].

The questions about other scientific categories of theoretical principles of information support of social audit, such as conditions, functions and methods, in our opinion, are on the border of theoretical and methodological principles of research, but more inherent in methodological principles, so

y are prospects for further research. Summary of the results of the study is shown in Table III.

TABLE III. SUMMARY OF THE MAIN CATEGORIES AND CONCEPTS THAT DETERMINE THEORETICAL PRINCIPLES OF INFORMATION SUPPORT OF SOCIAL AUDIT

Categories	Interpretation
The object of research is internal control	A set of organizational measures, methods and procedures used by the management of the economic entities for the organization and effective conduct of business, ensuring the preservation of assets, detection and prevention of errors and misrepresentations, and timely preparation of reliable financial (accounting) statements.
The subject of research is information support of social audit	An interconnected set of information created in accordance with needs of social audit entities, as well as technologies, tools and measures aimed at the effective functioning of the effective social audit system at the enterprise.
Entities of information support of SA	Persons, who are directly involved in the formation, operation, improvement of information support of social audit.
The purpose of information support of social audit	Consists in providing an information for social audit entities for effective performance of their audit functions.
Tasks of information support of social audit	- ensuring compliance with information requirements of social audit entities to the information provided on its quality, content and quantity; - timely formation and transmission of necessary information to the social audit entities; - ensuring the use of uniform methods and methods of accumulation, selection, processing and transmission of information by all entities of information support social audit; - ensuring communication between entities of information support social audit and entities of social audit.
Principles of information support of social audit	Continuity and development, combination of inductive and deductive approach, combination of qualitative and quantitative assessment, synthesis and analysis, research in statics and dynamics, as well as integrity, unity and consistency, compliance, reliability, optimality, efficiency, rhythm, control, protection against unauthorized access, flexibility, standardization and unification, adaptability, integrity, minimization of input-output errors, relevance etc.

Source: authors development

At present, the issues of forming a specific structure and model of information support which would take into account the specific needs of the enterprise related to its industry affiliation are insufficiently studied.

The quality of information support also depends on the capacity of the information technology, optimization of information flows, building an effective information relationship with the external environment. The high level of information support of social audit will increase the efficiency, adequacy and efficiency of decision-making, both operational and strategic management of the studied enterprise.

Development of information support of social audit consists in forming a system of information technologies, software and hardware for:

– organization of a continuous process of collection, processing, storage, retrieval and timely transfer of reliable information on social audit to all levels of management;

– ensuring high reliability and reliability of information in accordance with established requirements of collection and processing at each level of management.

The content of information, its processing order, formation, transmitting are determined by industrial specifics of the enterprise, its organizational structure, the peculiarity of technological processes.

Social audit is a very complex process due interconnected and interdependent aspects of its activities, which have their own priorities and are determined primarily by:

– specialization of the enterprise;

– seasonality of work, when certain works should be done in specified period with the most efficient use of resources;

– the dependence of the work results on the level of development and function of social domain;

– the activities of state and legislative bodies;

– the level of development and efficiency of infrastructure [7].

Modern enterprises operate in conditions of constant change in the “external environment” (legal legislation, economic conditions) and the “internal” environment (change of ownership, restructuring of enterprise). This, in turn, causes to changes in the content of information, methods and algorithms of processing and direction of its transmission.

Modern information supply of the enterprise has certain shortcomings, namely: insufficient provision of means of information collection and processing, obsolescence and inaccessibility, outdated methods of information collection and non-operational transmission. Awareness and timely implementation of management information support will facilitate effective management decisions regarding the production and sale of products.

A procedure for data collection, built on three levels [9]:

- level one – the so-called grassroots level (various production departments, warehouses). At this level primary documents for the accounting warehouse inventory, final products, workers’ productivity etc. are collected;

- level two – general economic level (auxiliary units, departments, services, etc.). The data on accounting financial and settlement transactions, tangible assets, fixed assets, accounting for labor and wages etc. are collected;

- level three – the level of consolidated accounting (book-keeping). At this level the data collected at the previous two level are grouped and summarized [9]. Decision making frequently require using mathematical models for prediction different characteristics [10-15]. In case of uncertain conditions, data-driven models, built on interval approach, are used [16-24]. The formation of information support for social audit requires comprehensive consideration of the peculiarities of the interaction of structural components of the information system; information technologies for the implementation of information processing methods; functionality of technical means. Fig. 1 illustrates the levels of formation of information support of social audit at enterprises (micro level).

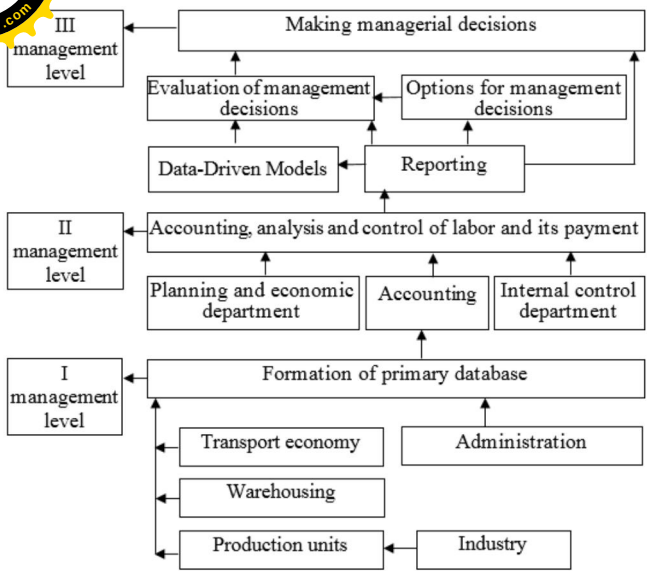

Fig. 1. Levels of formation of information support of social audit at enterprises (micro level)

Source: the authors development based on the source [9].

An improved procedure (2) of the formation of information support for social audit in accordance with the levels of management is proposed (Fig.2): the first is the global level; the second is the macro level; the third is the meso-level; the forth is the micro level, which consists of strategic, tactical and operational sublevels to optimize the formation of information flows in the enterprise [25-38].

A particularly important task while creating the information support is to determine the range of potential users and their information needs. In the article [3] it is proposed to divide the whole range of users of information support into two groups: internal and external. Thus, the internal users of the social audit of enterprises include:

- enterprise managers and accounting staff;
- owners and co-owners of the enterprise;
- employees.

To external users refer:

- tax administrations of all levels;
- financial and credit authorities;
- potential investors and regulatory authorities;
- creditors.

The information needs of external and internal users differ in amount of information required and its content. Information support of social audit is informationally interconnected with different areas of accounting: financial and settlement operations, production costs, finished products, consolidated accounting and reporting and subsystem accounting and personnel management.

This relationship is provided by:

- feedback of different accounting areas;
- using the source information for one area of accounting as input for another area;
- commonality of some sources of information for several areas of circulation;
- commonality of some primary and reporting forms for several areas for accounting;
- unification of the information coding system in the accounting information system for all sites;

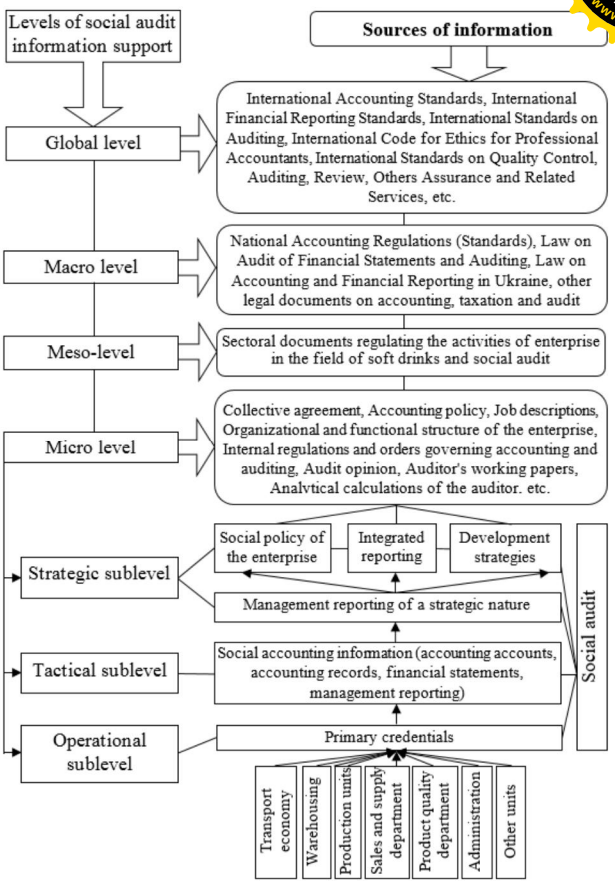

Fig. 2. Levels of information support of social audit

- consistency of indicators that characterize a particular object and are used in interrelated areas of accounting. The set of tasks of accounting for financial and settlement operations uses information on the payment of wages through the cash register and current account, accrual and payment of insurance premiums, etc., obtained from the area of labor and wages accounting [39].

IV. Conceptual Model of Information Support of Social Audit

On this basis, a conceptual model of information support of social audit is developed (Fig. 3). It reflects its tasks, functions, components and the order of formation of the information data-base, enables accuracy, completeness of information for making appropriate managerial decisions [30]. The subsystem of accounting and personnel management accumulates information about the average number of employees for the reporting period, changes in the number and structure. The essence of information support is to perform accounting, control and analytical procedure in real time, detect and analyze deviations from planned indicators and use the results.

Within the framework of well-established methods of accounting there are new modifications of economic information, in particular in theory and practice distinguish creative accounting, social accounting, human resources accounting, which leads to the emergence of new reporting formats, including social. Most scientific discussions are related to creative accounting, primarily because the use of any method of creative accounting is generally a temporary measure to solve a specific problem.

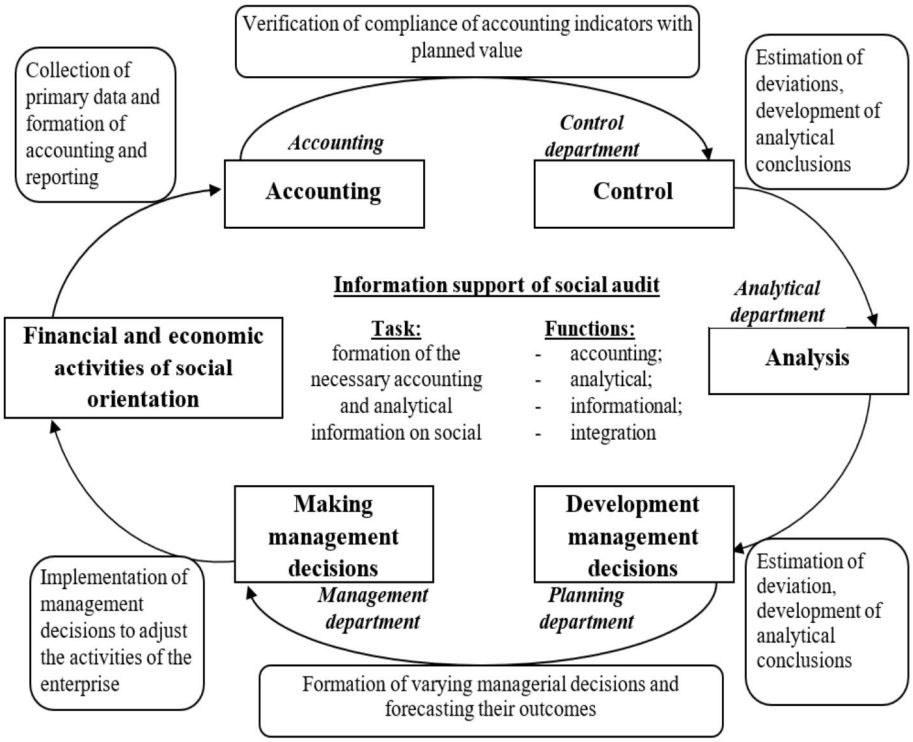

Fig. 3. Conceptual model of information support of social audit

Creativity in accounting also highlights the issue of professional ethics of the accountant, which is generally perceived ambiguously. In view of this, it is not yet time to single out creative accounting as a separate type of accounting. A number of unresolved issues concern the presentation of social accounting as a separate type of accounting. It should be borne in mind in the context of the separation of creative and social accounting, the fact that the modern accounting system is based on clear principles in practice, in accordance with which accounting information is formed. This means that at the request of a wide range of stakeholders, accounting has acquired the features of both creativity and social orientation, which is an important condition for the social orientation of business at the present stage of economic development.

Depending on the objects of audit, information support is subject to a kind of differentiation (distinction or fragmentation). It should be noted that since there is still no clear legal regulation of documentation in the field of management and, accordingly, in the audit of inspection and evaluation of management facilities, businesses should create a model of accounting policy of the enterprise, which would the requirements for the creation of special documentation for the objects of management activities were taken into account. Building such a model in modern business conditions will contribute to the organization of adequate management documentation, which will be based on the principles of legal regulation of the main management functions and effective organization of information support for management audits and other controls.

CONCLUSIONS

Thus, from the standpoint of a systematic approach, the concept of information support of social audit should be considered in three aspects: as a set of data and knowledge obtained from internal and external sources, systematized, stored and designed to meet the information needs of users; as a system of hardware and software, information technology, methodical instructional materials, methods of classification and coding, in the process of interaction of which a single technology of effective transformation (collection, registration, transmission, storage, processing and presentation) of information according to management needs; as a component of the enterprise management information system.

To improve the order of formation of information support of social audit it is necessary to study information requests at different levels of government: global; macro levels; meso levels; micro level, which includes strategic, tactical and operational sublevels. The conceptual model of information support of social audit developed on this basis, with the description of its tasks, functions, components and the order of formation of information base, will provide receiving the full and reliable information necessary for acceptance of the corresponding administrative decisions of a social direction.

Implementation of the proposed approach to information support is possible using a system of hardware and software, information technology, teaching materials, classification and coding, combined into a single technology of information formation through a set of interrelated procedures for its collection, registration, transmission, storage, elaboration and provision for management needs.

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