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**INTEGRATED IT SOLUTIONS FOR AUTOMATION OF FINANCIAL AUDIT IN
RUSSIAN FEDERATION**

Examiners: Professor Jari Porras
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ABSTRACT

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School of Engineering Science

Software Engineering

Master's Programme in Software Engineering and Digital Transformation

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Integrated IT solutions for automation of financial audit in Russian Federation

Master's Thesis

2021

87 pages, 21 figures, 7 tables

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Keywords: audit, automation, information systems, IT, business processes, modeling

Thesis devoted to the analysis of the domestic market of audit automation systems and the detection of their weaknesses. Tasks that were solved in the course of the study: 1) Study of audit automation systems offered on the Russian market, 2) Identify the best existing solution, 3) Economic efficiency from the use of software, 4) Identify the weaknesses of this solution, 5) Development of recommendations for improving the software, 6) Opportunities to commercialize a new solution on the market. The work was carried out in the company "Osnova" JSC, where the information needed for the study was collected based on the experience of users. The cost-effectiveness analysis was performed using the AuditXP software. Finally, as a result, 3 domestic solutions in the field of audit automation were analyzed, and the best of them was selected. The weak points of this system are analyzed and its architecture is reengineered. The efficiency of using a ready-made solution is analyzed. The possibility of commercialization in the case of creating your own solution is considered.

ACKNOWLEDGEMENTS

Thanks to my supervisors from university Lappeenranta University of Technology – Professor Jari Porras and Associate Professor Ari Happonen, and also supervisor from university Peter the Great St. Petersburg Polytechnic University – Professor Ilyin I.V., for guidance and feedback throughout the project.

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LIST OF SYMBOLS AND ABBREVIATIONS

IT	Information technology
IS	Informational system
ISA	International Standards on Auditing
SRO	Self-regulatory organization
HR	Human Resource
PR	Public Relations
FL	Federal Law
MC	Microsoft
PC	Personal Computer
PP	Payback Period
SRR	Simple rate of Return

1 INTRODUCTION

Throughout almost a century of development, information systems have been used to varying degrees and on different scales to optimize the production process, simplify organizational work, process information, systematize it, analyze it, store data, etc. Since the advent of IS (50 - ies of the last century), its main functions are: collection, transmission, storage of information. The development of new information technology (IT) brings qualitative changes to the formation of IS, gradually replacing the traditional, long-established forms, and modernizing for each individual case on another hand, the miniaturization of the technologies, ICT and IS have also pushed many traditional business operations and industries forward [41][42] Additionally, the fast technology development has put new demands on software developers in software solutions and technology connected [40]. And nowadays current competitive environment, the consumer has become an active factor in society [43] and in the efforts of manufacturers [46].

At the same time, the key factor for the success of companies is precisely customer satisfaction with the relationship with the supplier of goods and services.[31] The fight for the customer become more and more fierce. And in this "battle", as experience shows, those managers who consider advanced technologies as an important tool for business management come to success faster. Although some believe that the introduction of innovative technologies is the fate of the activities of support services. And it doesn't matter if the company operates in the corporate or retail market. Currently, process automation has one of the most important positions in every industry. Robots are being introduced everywhere, new software that works with a greater degree of autonomy is being embedded. The direction of introducing artificial intelligence into the main business processes of many companies from various fields of activity is actively developing, "smart" robotic consultants appear, complex models of artificial neural networks are created to determine the dynamics of quantitative and qualitative business indicators, other machine learning techniques are used to predict key factors rise or fall. Of course, the audit also undergoes many changes. Now it is impossible to entrust the audit of the company's financial statements exclusively to software, a lot remains depending on people, since it is impossible to fully formalize the audit process, the structure and scope of the procedures performed, there is the need to form professional judgment regarding each client. Nevertheless, every year technologies are developed and implemented that allow to

transfer some of the work to machines. Computerization of audit activity is currently an important direction in the application of information technologies. In recent years, there has been a rapid development of hardware and software platforms. With the advent of new information technologies, there is a problem of translating algorithms for solving audit tasks. The huge variety of information technologies that have appeared in recent years requires the choice of the optimal, adequate essence of the tasks to be solved. In the course of accounting audits (mostly automated), you can combine computerized and manual methods. At the same time, preference is given to technically advanced techniques, possibly with the exception of small businesses with a minimum amount of information for verification, where the use of computer testing by auditors is not rational.

This study will address such aspects of IT-solutions in the sphere of audit as exploration and evaluation of such solutions, which brings qualitative changes to the formation of IS, and the changes they make in the audit process when implemented within companies for permanent use. It will review the specifics and the results of using audit software, sequential opportunities and the way of application of IT-solutions with efficiency. For this, both theoretical aspects and practical research will be included in the thesis.

Nowadays, in scientific terms, the functions of IT are studied in sufficient detail by theorists, but, unfortunately, the study of the effectiveness of including IT in the daily production process of companies is fragmented and requires constant attention. It will help to identify new important aspects that could be useful not only for expanding the field of scientific research, but also mainly for implementation in business practice. This is precisely the relevance of that paper.

However, in this area, the level of automation is much lower than in accounting.[39] Also, the area is quite complex, and multiple factors have to be taken into account. In order to ensure the high quality of audit services, it is necessary to implement functions for the development of accounting forms and documents, as well as to determine the audit risk, the level of reliability and materiality, and the sample size. Given the fact that the audit is based on data obtained on a sample basis, to calculate the optimal sample size, you need to resort to probability theory and mathematical statistics, which significantly complicates the calculations. So this paper will explore the solutions that help to solve these questions and the way they are currently used in practice and the opportunities their implementation provides. The subject of the study was the analysis of the domestic market of existing

solutions for financial audit automation, detection of their advantages and weaknesses, as well as the practice of using the latter in the audit company.

The purpose of the study was to review the possibilities of using audit automation systems to obtain qualitative and quantitative results in the course of activities. The questions that will be discussed include study of audit automation systems offered in the Russian market, identifying the best existing solution by comparing them, and studying economic efficiency from the use of software within companies. Then the study will proceed with exploration and identification of software's advantages and disadvantages and, therefore, recommendations for improvements. In the end the opportunities to commercialize a new solution on the market will be explored.

Key methods for this research will include a study of the compiled data that already exists in terms of theoretical aspects and the examination of existing solutions, questionnaires in order to determine advantages and disadvantages of the programs and a case study that deals with the practical part of this work.

The main parts of the work proceed in the corresponding order. First, it will explore the theoretical part in order to give a full overview of the existing situation legal-wise and in terms of audit automation exigency to help understand further research. Next, the focus will be on analyzing and evaluating IT-solutions in Russia, comparing their features and their implementation from the point of view of users. This data will be also needed in final part with the study of practical implementation of IT audit solutions and exploration how to make the experience even better by both introducing new features of existing programs and developing new solutions whatsoever, and also how to make the transition to this automated solutions smooth and advantageous for a company and auditors.

2 ASPECTS OF THE AUDIT IN RUSSIAN FEDERATION

According to the Russian Federal Law “On Audit Activities”, auditor activities (auditor services) are the activities for carrying out audit and rendering the services accompanying audit performed by auditing organizations, individual auditors. [19] An audit is an independent verification of accounting (financial) records of the audited face for the purpose of expression of opinion on reliability of such reporting.[17] This procedure also applies to all processes that take place within the company, products produced, and projects implemented.

An audit is not an identification of a control check. The goals of these procedures are not identical.[17] The main objective of an audit is to identify errors and assist in their elimination. The audit results are conclusions about the state of the financial reporting.

2.1 Types of audit

There is a clear definition for an audit, however, there are multiple types of audit that fall under this definition. Types of audit are well studied by many legal experts. Therefore, it is possible to perform a different classification of the audit, depending on the various features in each category. So, before proceeding to study audit services, a closer look at the types of audit will be taken. [22]. In this thesis, the audit types have been divided into several subgroups according to their classification, so that it is easier to understand what purposes they pursue, how they are initiated and what falls under review in each type of an audit. In the division, the first two types of audit are classified according to their relation to an audited entity: either external or internal. The audit can be performed internally by the employees of the entity or by an outside organization.[13] External audits assess the reporting system, checking and evaluating the assets and liabilities of the entity, testing the existing internal control system, while internal audits involve a system of monitoring over compliance with the established accounting procedure and the reliability of the internal control system functioning organized by the entity, acting in the interests of its management or owners, and regulated by internal documents.[18]

Next subgroup is much more diverse as it deals with various tasks that an audit is supposed to solve. Here are the widely occurring types and review what they deal with. First, I would like to start with a more general type: a management, or production, audit, which is an assessment of resources application, checking and improving the organization and

management of an enterprise, the quality aspects of production activities, evaluating the efficiency of production and financial investments and productivity. Then, if the company needs to organize an objective examination and a comprehensive analysis of business operations for the purpose of increasing their efficiency, then a performance audit will be needed. As for a compliance audit, it is necessary in order to estimate an entity's compliance with regulatory conditions, rules and laws, and includes an analysis of certain financial or business activities of this entity. Another common type is the financial audit. The main purpose of a financial audit is to verify the entity's financial statements in order to check their compliance with the established criteria and generally accepted accounting rules. Financial audit is the most frequent type of audits. There is also such type as a special audit, which is a review of specific issues in the activities of an economic entity, compliance with certain procedures, norms and rules; the main purpose is to confirm the legality, integrity and effectiveness of management activity, the correctness of tax reporting, the use of social funds (environmental, legal etc.).[15]

Audit types can be classified by their implementation time, as both the length of the audit process and its periodicity vary depending on the type. For example, an initial audit is conducted by an auditor for a client for the first time. This significantly increases the risk and complexity of the audit, as auditors do not have all necessary information about the specifics of the client's activities and its internal control system. Then, a coordinated audit is performed repeatedly or regularly by an auditor and is therefore based on the knowledge of client's specifics, its pros and cons in the organization of accounting, as well as the results of a long-term cooperation with the client (consulting, assistance in organizing the internal control system). Another type is an operating audit which is a short-term audit for an overall assessment of the state of accounting, reporting, compliance with legislation, the effectiveness of internal control, and performance evaluation.

The types of audit can be also outlined by the nature of the audit. In the context of the development of audit, its range and volume provided by audit firms is expanding: audit and audit procedures have continuously evolved. So, the nature of an audit is based on the stages of development. A verification audit implies checking and confirming the accuracy of accounting documents and financial statements. A system-oriented audit is an audit expertise based on the analysis of the internal control system. And a risk-based audit focuses on the entity's risk management.

Finally, the types of audits are classified based on the obligatoriness of the procedure, according to Federal law №. 307-FL. A mandatory audit is carried out in cases established by law or on behalf of state bodies. The scope and procedure for carrying out the statutory audit are defined by the legislation. A voluntary audit is carried out by decision of an economic entity on the basis of an agreement with an auditor. The nature and scope of such an audit is determined by the client.

So, five main subgroups of audit types were outlined, which helps to grasp the idea of the audit process, purpose and its expected outcome. Therefore, it is possible to carry out a different classification of the audit, depending on the various characteristics that underlie the classification. The types of audit are well studied in multiple previous researches and are considered generally accepted nowadays, and legal scholars agree on this classification, which makes it common practice applicable for this work as well.[36]

2.2 Auditing services

Now, as there is the definition of an audit and various classifications of audit types, the next step is mentioning the auditing services and their main types (key areas of auditing activities). The principle is the same as in the previous part: the classification into subgroups will be considered in order to make the understanding of this wide field easier and to structurize the number of services mentioned in this paper.

First, the most common services that also have the widest range are mentioned. There are four types of auditing services classified by their focus and the sphere of implementation. So, a financial audit is a comprehensive independent audit of the economic state of an organization which assesses its reliability and prospects for its development. Then there is an investment audit, which is an audit of professional securities traders, various investment funds, including a comprehensive review of an investment project, followed by an outcome evaluation. [20]. An industrial audit is a special system of measures that combines the elements of a nonrecurring financial and technical control of the quantity and quantity of works actually completed for compliance with projects, building code requirements, standards, technical specifications and other regulatory documents. Another type is a management audit, which is the diagnostics of the organization's existing management system, its production, commercial and social activities aimed at the identification of

problems and the ways to solve them, exploring the methods to improve the effectiveness and efficiency of the company's work.

Besides these common types of services, it is also worth mentioning highly specialized areas of audit services, which are the most widespread. Here ten types are considered, as these types are crucial in the activities of most entities and are therefore applicable for many various businesses[36].

- The first type that should be reviewed is a tax audit. It includes performing a special audit task by an audit organization to review the accounting and tax reports of an economic entity in order to express an opinion on the degree of reliability and compliance in all material aspects with the norms established by law, accounting treatment, tax payment and other payments into the budgets of various levels and extra budgetary funds;
- An operational audit is a review of the economic system, business operations, statement of estimates, managements systems operations, purpose-oriented programs in order to assess their productivity and efficiency;
- An audit of the sales department is an analysis and verification of the entire sales system: segmentation of customer requests, qualification of personnel in customer communication, the process of working with customer requests and the employee motivation system;
- An audit of expenses is an examination of all indicators in an organization's financial statements in the context of expenses, followed by an assessment of the reliability and compliance of their accounting with the requirements of regulatory acts;
- A personnel audit (HR audit) is a procedure for evaluating the effectiveness of the company's existing HR management system in order to obtain an accurate and independent analytical assessment of the compliance of the organization's HR potential with its goals and development strategies;
- A web-site audit is a comprehensive analysis of an Internet resource for its compliance with the requirements of positioning standards, search engine optimization for a competent promotion, as well as evaluating user adoption;
- A PR-audit is a comprehensive, integrated assessment of internal and external communications of an organization or a project, a tool to track results from a PR campaign for the analysis of resource usage rationality, and the development and

implementation of strategic plans to promote products and services of a project or an organization;

- An environmental audit is a substantive and independent assessment of compliance with requirements, including the requirements of existing international standards, regulations and regulatory documents in the field of environmental safety, environmental management and environmental protection, as well as the preparation of relevant recommendations and their documentation to improve the performance of enterprises and organizations in the environmental sphere;
- A legal compliance audit (Legal audit) is an analysis of a particular financial or business activity to determine its compliance with the prescribed conditions, rules or laws, which is also necessary for clarifying whether legally significant documents used in the work meet the interests of the enterprise;
- A price audit is an independent expert assessment of the economic, technical and technological characteristics of a product, work, service or an investment project to evaluate the price reasonableness. [32, p. 180-200]

2.3 Audit-related support services

Audit-related services imply entrepreneurship activities conducted by auditor firms besides auditing itself. Providing such services require independence where required as well as professional competence. The full list of such services is regulated by the Federal standards on auditing. For example, the review, agreed-upon procedures and compilation of financial statements. Article №. 1 of part 7 of Federal law №. 307-FL of 30.12.2008 and the Decree of Russian Financial Ministry N 33-n of 09.03.2017 contain an approximate list of additional audit services. [19] They include:

- Maintaining, restoring and setting accounting records, preparing financial (accounting) statements, consulting on accounting issues;
- Tax consulting, maintaining and restoring tax records, assistance in drawing up tax returns and calculations;
- Analysis of economic and financial activities of firms and individual entrepreneurs, financial and economic consulting;
- Management consulting, aid in the reorganization and privatization of organizations;

- Providing legal assistance in areas directly related to the activities of auditors, legal advice and representation in civil and administrative records management, in customs and tax legal relations, in local self-government bodies and state authorities;
- Assistance in implementing information technologies and automation of accounting management in the accounting system;
- valuation activities;
- Preparation of business plans, development and analysis of investment projects;
- Conducting experimental work and research activities in areas related to an audit. Dissemination of research results, including electronic and hard copies;
- Training in areas directly related to audit activities.

2.4 Characteristics of the audit procedure

A well-conducted audit of various areas of the company's activity will help not only to verify the reliability of financial statements, but also to identify and eliminate errors in a timely manner, which will help to avoid problems with regulatory authorities. Conducting an audit of a company is a procedure that follows certain rules, and the main principles and procedures for its implementation will be reviewed. [22, p. 80-97]

The first stage is issuing an audit engagement letter. The process begins with the company contacting a selected audit firm with a written request for audit services. The auditor's response is an audit letter, which specifies the objectives and scope of the audit. This document is sent to the company prior to signing the contract for verification, in order to brief on the aspects of an upcoming agreement and receive a written confirmation from the client. After that, the conditions set out in the letter remain valid for the entire term of the agreement.

In essence, an audit commitment letter sent to the client is a confirmation of the auditor's consent to carry out the audit procedure or, if it was included in the request, acceptance of an offer for long-term cooperation with the client. The content of the letter, as well as its form, is determined by the demand to introduce mandatory instructions and additional information based on the specifics of the forthcoming verification. The letter contains mandatory instructions for the check conditions (i.e. of an object, purpose, and audit procedure; execution of an audit conclusion; regulatory documents for conducting an audit; their issues related to verification), obligations of the audit firm (such as the reporting form

on the results of the work; the responsibility for the services provided; non-disclosure of the customer's trade secret; the risks of unidentified accounting and reporting errors that may arise due to the selective nature of the techniques used and an imperfect internal control system), obligations of the customer (such as responsibility for completeness and accuracy of the provided financial documents; for providing access to accounting documents and registers, an electronic database and other information required for verification; for sending reconciliation reports by the company to counterparties to confirm the existing debt; for the lack of pressure on auditors to change their opinion on the veracity of the company's financial statements).

Next, review the audit steps and procedure will be reviewed. Since an audit is a complex procedure that requires a well-designed plan and consistent step-by-step implementation of each step, an auditor should strictly follow the procedure for conducting an audit, which consists of:

The preparatory stage, i.e. preliminary planning of the audit, when the system, strategy and methodology for conducting the audit are determined. Besides, the scope of work and its cost are stipulated, and a contract is concluded.

Evaluating the effectiveness of the company's internal control and planning the audit itself. At this stage, the auditor gets acquainted with the nature and activities of the company: examines primary documents, accounting registers and financial statements in accordance with the audit software, compares information, performs analytical tests, calculations and other necessary procedures. When forming an opinion on the reliability of accounting documents, the auditor uses the techniques described in the audit letter (see above);

Preparation of an audit report that represents the auditor's opinion on the veracity of the company's financial statements. It is based on a certain form and contains the necessary information. The four types of auditor opinions are:[36]

- Unqualified opinion (clean report);
- Qualified opinion (qualified report);
- Disclaimer of opinion (disclaimer report) - for various reasons, such as the lack of necessary documents or circumstances that may affect the auditor's opinion;
- Adverse opinion (adverse audit report).

The methods of an audit, as well as its forms, are determined by auditors. However, they are divided into two categories - the organization of the audit and the collection of audit

evidence. They organize verification by choosing the method of its implementation – continuous, selective, or combined. When collecting audit evidence, information obtained from different sources – internal and external - is being compared. Ideally, this information does not contradict each other. However, if information from one source does not correspond to the data from another one, the auditor should perform a series of procedures to clarify the reasons for the discrepancy. The reliability of audit evidence during an audit at the enterprise at all its stages depends on the techniques used by the auditor, such as company inspection, confirmation of the received information, monitoring, request for necessary information, recalculation of indicators, analytical procedures (tables, calculations).

The final stage of the audit is drawing an audit conclusion with an opinion on the veracity of the company's reporting forms. If an auditor has doubts about the reliability of the company's financial statements, he should try to obtain sufficient evidence to correct the mistakes. If it is impossible, the auditor issues a qualified report or a disclaimer report.

2.5 Overview of the audit regulatory framework

Practical audit activity often anticipates the normative framework. More often than not, audit companies aim to develop the market of audit services, expand the types of services and provide professional assistance to a wide variety of business entities. Such a situation led to a decrease in the insistence of high standards and even violations of the established rules, such as issuing of paid audit opinions without actually conducting an audit. This situation stimulated regulatory bodies to solve the problems of audits' quality control. There was also a need to form a single regulatory document, and in summer 2001 the provisional rules for auditing were replaced by a fully valid Federal law №. 119-FL of 13.07.2001 "On audit activities". In eight years of its existence, many amendments, significant adjustments and additions were made, which, in turn, led to the formation of a new Federal law №. 307-123 of 30.12.2008 "On audit activities" in December 2008. At this point in time, this law is a key document that is aimed at regulating audit services. [25]

2.5.1 Content of the law on audit activities.

The law "on audit activities" is one of the most important regulatory acts. It defines the role of auditing activities in financial and business relations. In Russia, historically, there are only state control authorities; an audit, however, has become the means of independent control.

Its role and place is determined by the above-mentioned law. Thus, the law "on audit activities" approves the following points:

- The formulation of an audit, audit activities and a list of associated services;
- A system of bodies and regulations that perform a regulatory function in the implementation of audit activities;
- The formulation of an auditor, audit organization, and self-regulatory organization of auditors;
- The sequence of certification of audit activities, justification of the need for its implementation;
- Conditions for the registration of self-regulatory organizations, membership of audit organizations and auditors in this association;
- Maintaining a register of SROs, auditors, and audit firms;
- Identification of situations where verification is mandatory;
- Formulation and systematization of audit standards;
- Privileges and obligations of audit companies and audited entities;
- Formulation of an auditor's professional opinion;
- A system of state supervision over the activities of SROs and quality control of audit firms.

However, not only this law regulates the basic requirements for conducting business. To date, Russia has adopted the concept of mixed regulation of auditing activities. All the main elements of the regulatory system are defined at the legislative level.

2.5.2 The system of legal regulation in Russia.

Statutory regulation of audit activities in Russia is carried out on the basis of four levels of regulatory acts, which are presented in table 1.1:

Table 1. Statutory regulation of audit activities in Russia

Regulation level	Documents	Authority

1 level	Federal laws, requirements, and instructions	Federal Assembly, Government of the Russian Federation, State Duma, President of the Russian Federation
2 level	Resolutions, orders, federal standards of audit activity, standards of audit activity, code of professional ethics of Auditors	Government of the Russian Federation, Ministry of Finance of the Russian Federation, Department of Regulation of State Financial, Control, Auditing, Accounting and Reporting
3 level	Codes of professional ethics of public organizations, standards of public organizations, methodological guidelines and regulations of public organizations within their powers	Self-regulatory organizations of auditors
4 level	In-house standards, the rules for the implementation of quality control	Audit organizations, individual auditors

Hereafter, the four different levels mentioned above will be explained in detail. The first level is represented by the civil and regulatory code of the Russian Federation, Federal laws: "on audit"; "on self regulating organizations"; "on joint-stock companies"; "on the Central Bank of the Russian Federation (Bank of Russia)" and others. In addition, it includes regulatory acts of state power, namely the decree of the government of the Russian Federation of 06.02.2002 №. 80 "on issues of state regulation of audit activities in the Russian Federation" and so on. They are used to regulate auditing activities at the state level. [19]

The second level is represented by the national code of professional audit ethics, federal standards, regulations, and guidelines issued by the authorized federal regulatory body of the Ministry of Finance of the Russian Federation within the competence within its competence. These guides include the order of the Ministry of Finance of the Russian Federation №. 93 dated 12.09.2002 "Temporary regulations on the system of certification,

training and advanced training of auditors in the Russian Federation"; the "Interim regulation on the organization and implementation of control over compliance by auditors with the rules (standards) of professional activity and professional ethics", approved by the audit council under the Ministry of Finance of the Russian Federation on 30.10.2008; the order of the Ministry of Finance № N33n dated 09.03.2017 "On defining the types of audit services", and others. [1, p. 1-99] The leading role in the development of such documents is assigned to the audit council, and therefore they can be attributed to regulatory acts of mixed regulation. This level includes acts of professional auditors' associations. They are formed by associations in the context of their authority and are represented by the codes of professional ethics of SROs, standards, methodological guidelines and regulations issued by SROs within the scope of their powers.

The fourth level entails the standards for implementing internal quality control developed by audit organizations and individual auditors, as well as internal audit methods and standards. Regulatory acts of the third and fourth levels allow for self regulation of auditors' activities. The functions of regulating relations between self-regulating audit organizations are performed by the Federal law №. 315- 123 of 01.12.2007 "on self-regulating organizations". Such enterprises generalize the subjects of entrepreneurial or professional activity, conducting interaction between self regulatory organizations and their members, customers and executive authorities. The law "on self-regulating organizations" contains:

- The definitions of self-regulation and its subjects;
- The subject of self-regulation, standards and rules, general conditions for accepting an SRO non-profit organization. The content of self-regulation is usually defined as the development and formation of standards, rules for a specific type of activity, as well as monitoring their compliance;
- The structure of management bodies, basic functions, rights and obligations of a self-regulatory organization;
- The need for the development and approval of standards and rules of an SRO, the creation of specialized bodies monitoring compliance;
- The procedure for exercising control of a self-regulatory organization over the activities of its members;
- Mechanisms for ensuring the property liability of SRO members to consumers of goods and other persons.

2.6 Aspects of audit automation

In present-day conditions, in order to ensure the proper quality of services and keep up with their "brothers in the profession", audit companies need to have employees who are engaged in the development of procedures, documents and reporting forms that comply with the current audit standards. Not all audit firms, much less individual auditors, can afford it. Often, the problem is not even in the cost of employment, but in the lack of necessary specialists in Russia. However, even a methodologist in the company does not solve the problems associated with processing a huge amount of data and filling out a large number of documents when planning, conducting audit procedures and analyzing the results obtained. In addition, the audit is conducted on a selective basis, which means that it is necessary to use the methods of mathematical statistics and probability theory, which significantly increases the number of complex calculations. Based on this information, we can identify several main criteria for software that automates audit activities:

- First of all, the audit software must offer an audit methodology that is fully compliant with the audit standards;
- Secondly, it should contain the necessary and sufficient number of working documents of the auditor (forms) to document the work done by the auditor;
- Third, to ensure maximum automation of information input and processing at all stages of the audit;
- And, finally, provide the ability to use the client's accounting database to build a sample and analyze it. [6]

Therefore, audit software should have a user-friendly interface and an intuitive algorithm that allows users to easily and quickly learn how to use the software. It should also provide for the possibility of autonomous work of auditors with the possibility of combining data into a single database.

2.7 Challenges of audit automation

Based on the information received about the audit, it is possible to draw conclusions about main challenges and requirements that I have to take into account when talking about introduction of IT solutions in this field. First, it is necessary to highlight the fact that this sphere has become strictly regulated over the years: now there is a Federal Law plus multiple rules regarding auditing activity that audit companies have to comply with, as it means

observance of the laws of Russian Federation. That means that any software provided for auditing activities should consider laws and regulations as well, and it will be one of the main requirements to any program aiming to be successful in the Russian market.

Second, the meaning of an audit for an audited entity cannot be overemphasized. Besides all crucial recommendations that a company receives, this refers to a company's reputation. That is why not only an auditor's qualification and judgement are highly important, but also quality, features and functions of software used in an audit.

The third challenge is represented by a number of types of audit, the purposes of audit, the amount of audit services and their objectives. Taking into consideration that an audit automation system should be built flawlessly with regards to any of these types, it is important to bring into focus that audit software is expected to be fully-featured and applicable for all kinds of audit activities in order to be considered reliable.

And the fourth factor worth mentioning is the lack of automated companies: the level of automation in the field of audit is still relatively low. So it is important to understand the opportunities of introducing IT-solutions to more auditing companies and track the progress to see competitive advantages.

To further explore these challenges and to find opportunities of solving problems, the study of the Russian market is presented and existing software solutions and their application are explored.

3 ANALYSIS OF AUDIT AUTOMATION SOFTWARE

Now that theoretical aspects of an audit have been covered, in the second part of the work the study will proceed with the examination of existing solutions and their comparison in order to determine advantages and disadvantages of the programs. The research method of using questionnaires to collect opinions and user experiences will also be applied. The task is to evaluate several IT-solutions and choose the one determined by its advantages for further research and a subsequent case study.

3.1 Review of existing IT solutions for audit automation

The audit company automation is not a simple task. There are many specific problems in this field. Some of them may initially complicate the work of the company, but at the same time prompt automation of a number of procedures and business processes. To ensure the quality of the services provided, audit companies should implement the functions of developing audit procedures, auditing documents, accounting forms corresponding to the current auditor standards, as well as procedures for determining the level of materiality, audit risk and audit sampling. But even if there is an employee in the company who deals with these issues, he won't be able to solve all the issues associated with processing large volumes of data and filling in a large number of documents when performing planning, audit and analysis of the data obtained. Therefore, it is necessary to automate routine audit procedures. The implementation of an automated audit was regulated by the auditing standard "Conducting an audit using a computer" (approved by the Commission on Auditing Activities under the President of the Russian Federation). In the modern legislative and normative basis of auditing activities, there is no standard on automation. But audit organizations can use the mentioned standard for the development of an in-house standard. According to the data standard, the auditor who considers the possibility of applying certain audit procedures, should be guided by the auditing activity rules "Audit evidence" and "Analytical review". Therefore, the audit program should propose an audit methodology that is fully consistent with auditing standards.

Auditing is usually based on a sample basis, so the auditor must use mathematical statistics and probability theory to calculate the optimal sampling, which significantly complicates the calculations. The ability to use the client's accounting database for sampling and analysis in order to save the auditor's labor and time is an important requirement for the audit program.

The program should contain all the necessary forms (working papers of the auditor) to document the work done.

Under current conditions, it is simply impossible to ensure compliance with all audit standards without the use of automated tools. When conducting an audit, the auditor needs to assess the risks, calculate the materiality of items in reporting forms, and identify material items. Based on this, he needs to prepare an audit plan and program, as well as adjust the materiality depending on certain conditions in an accounting area and determine the sampling. Then an auditor needs to decide which documents of the client should be checked. When the documents are checked, errors and discrepancies are identified, then, according to special formulas, the error rate is applied to all documents. This work must be done before the auditor draws up an opinion on the reliability of the client's reporting. For each action, the auditor must have a form (a working document of the auditor).

Of course, the auditor can make the main documents in Word or Excel, where it is possible to automate some calculations, but most sections cannot be automated in this way, for example, sampling. Most auditors are familiar with statistical sampling analysis, but few apply them in practice due to the complication of selecting sample elements. However, this task can be solved using a specialized system. Depending on the size of the audit company and the specifics of the organization of management accounting, various functionality provided by the developers of the software can be used.

The selection of subgroups of homogeneous elements from the totality (stratification) makes it possible to increase the efficiency and accuracy of the audit sampling. Except for those cases where the totality can be easily divided into existing groups, the application of stratification without the use of computing technology is unjustified, especially when the stratification is based on the value of the element and the auditor does not have a list where the elements of the totality are arranged according to the increasing value. Automation significantly simplifies the stratification process. By exporting, for example, a log of accounting records to Excel, the auditor can easily sort investigated business transactions by ascending/descending value and group them as needed.

Other background causes for automation in audit are the general high level of development of the hardware and software market, the availability of computerized accounting systems, large amounts of information resulting in labour consuming nature of of audit procedures, standardization of audit and its technology, as mentioned above, mathematical models of analysis that can be considered as an object of automation, effective use of information and

reference systems (such as Consultant, Guarantor), and the regulatory framework for the creation of automated audit activities.

In this part popular and available in the Russian market IT-solutions for automation of audit procedures that can be used in the professional activities of auditors at the operational level will be discussed. Three programs chosen for the study were the following: IT Audit, Audit XP and Audit Modern.[15] The key factor that influenced the decision to focus on this solution was that IT Audit and Audit XP together take up the majority of the modern Russian market of audit automation systems, being therefore the most popular and widely used software. As for Audit Modern, it has the same share in the sphere of internal audit, so it will be included in the research and comparison as well. Studying this solution will help to understand which one is the most user friendly, which existing features it has to make the work of auditors more efficient and what advantages and disadvantages can be found out to work with later.

3.1.1 IT Audit

The software IT Audit: Enterprise is designed to automate planning and auditing of audit companies. The product can be used when conducting internal audits of a company, including financial audits and risk assessments; for the rapid processing of accounting data without the use of manual recalculation in order to conduct all mandatory auditing procedures. The software is based on a risk-oriented approach to audit and is instrumental for organizing audit documentation in accordance with ISA and for preparing to undergo a peer review.[13]

Uploading data to IT Audit implies that information is uploaded directly from the client's accounting documents. It can be either separate files in Excel, or the entire file of the 1C accounting software. Accounting reporting can be loaded via xml-file. Consequently, the software allows auditors to save time at the stage of data transfer.

Another important factor is the automatic creation of requests from an auditor to those charged with governance of the audited entity. The purpose of these requests is to obtain confirmation from the client on various aspects, such as the entity's intention to continue operations, the lack of affiliation to an auditor, obtaining data on litigation etc.

A key criterion of the auditor's work is a materiality guideline. As it is stated in ISA 200, the concept of materiality is applied by the auditor both in planning and performing the audit, and in evaluating the effect of identified misstatements on the audit and of uncorrected

misstatements, if any, on the financial statements. In general, misstatements, including omissions, are considered to be material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements. Judgments about materiality are made in the light of surrounding circumstances, and are affected by the auditor's perception of the financial information needs of users of the financial statements, and by the size or nature of a misstatement, or a combination of both. The auditor's opinion deals with the financial statements as a whole and therefore the auditor is not responsible for the detection of misstatements that are not material to the financial statements as a whole. [13]

A materiality guideline means the percentage of the balance sheet total, within which the accounting reporting inaccuracies are acceptable. The excess of the inaccuracy rate affects the reliability of the data provided. Performance materiality is identified by the entity, on the basis of the values and nature of corresponding reporting items. A generally accepted materiality threshold is 5%, which is a reporting item-annual returns ratio.

The auditor needs to determine materiality for planning and performing the audit, for evaluating the effects of misstatements on the audit results. If the auditor does not use any specialized audit software, this criterion is calculated in the following way: an Excel-file is created and the data from the accounting reporting is manually transferred in this file. Based on this data and on a complex formula, a necessary result is obtained, both for separate accounting items and for all reporting as a whole. Obviously, as well as in the case of manual processing of data, one error in the data transfer or an error in the Excel cells format would be enough to miscalculate the total result. IT Audit helps to avoid human factor errors.

Other significant elements of an audit are sending inquiries to business owners, receiving their replies and recording them for further use in the auditing work. Providing the availability of built-in templates, IT Audit accelerates this stage, both for the customer and for the auditor.

An important stage in information processing is its storage. The IT Audit software provides a means to save data on the audit object in the project format. These projects can be used later, for example, if the auditor works with the same client, in order to form a new package of documents. It helps to prevent duplication of information. For instance, the same legal address, founding members, the entity's operations, provided they remain unchanged for two consecutive years or other audited periods.

The final stage is the drawing up of the audit opinion. At the end of the work, the auditor issues an opinion and, even more important for improvements in the client's accounting, creates a multi-page document with a detailed description of all stages of work and all areas of the client's accounting. Substantively, the letter that the auditor sends to the client can also be formatted using templates, therefore, the availability of ready-made templates in IT Audit can make this stage more efficient.

Summing up, software such as IT Audit allows you to save time on various stages of documenting and conducting an audit. It helps with the formation of initial inquiries from the auditor to the audited legal entity, ensuring no conflict of interest and confidentiality, the transfer of data from the client's accounting reporting to be processed by an auditor, loading data from the client's accounting software directly to IT Audit, the assessment of the accounting state for errors and contradictions (for example, the discrepancy between the data of the registers of the accounting base with the numbers in the accounting reporting of the entity), the calculation of materiality criteria with no need for manual transfer of data to the auditor's worksheet, the preparation of the letter to the audited entity, and drawing up a final auditor's report.

The evidence from practice shows about 25% time-savings of an auditor, although in some cases the results may be even more efficient. It depends on the accuracy of the audited accounting, as well as on the technical skills and analytical talent of a particular auditor.

The IT Audit software, therefore, functions according to a precise algorithm that ensures compliance with all audit procedures and rules. It also creates conditions for the simultaneous minimization of time and labour and reduction of the auditor's error rate, which is justified, given the impressive scale of databases (including all accounting information for a whole year and a large number of primary accounting documents) that have to be dealt with during the auditor's work.

So far, no software can fully replace the skill of an experienced auditor. And yet, the software significantly saves time and effort, provides automated error control, allowing the auditor to focus on more complex aspects of work, including the use of emotional intelligence. IT Audit is not capable of such a deep level of intellectual analysis that is required from a high-class auditor, but it helps the auditor with the routine work and random arithmetic errors. It is plausible to assume that audit companies using such software may certainly work with more clients due to the optimization and acceleration of the processes.

3.1.2 Audit XP

The Audit XP "Complex Audit" software is designed to automate audit activities, primarily, for medium and small audit organizations and individual auditors, since its application allows organizing the work of an audit company in strict accordance with the current Federal Rules of Auditing, International Standards on Auditing, without developing their own standards for auditing, which can significantly reduce the costs of organizing audit activities. This program enables auditors to use databases from accounting software, such as "1C", "Turbo Accountant" etc. during the audit, including the automatic generation of a continuous, random, monetary and stratification sampling on its basis.[14]

It is feasible to completely change the software to fit the internal standards of the organization. The methodology block available in the new version of the software enabled audit firms to create their own audit methods without programming. To assess the quality of the audit, the software uses a system of criteria and scoring. To determine the level of materiality, the software uses only the method of financial indicators. Using the program, you can perform a standard financial analysis, as well as an analysis of revenue and cost, net assets, earning record, bankruptcy forecasting.

The Audit XP software is characterized by comprehensible audit methodology. The auditor goes through the procedures step by step; the procedures are interconnected into a consistent, precise, ready-made checking algorithm (methodology template).

The variability of the auditing methodology makes it possible to automatically adjust to the client's characteristics, materiality, risks, types of controls, and the results of the procedures. The autocomplete of documents means that once entered into the program, the information (whether it is the client's accounting data or the results of the auditor's work) can be used where it is further required. The documents are generated according to customizable templates in the audit methodology. Besides, all data is entered directly into the form in the software interface, immediately receiving ready-made working documentation. Information is selected from directories or is entered into working documentation automatically from other procedures, and can be edited manually.

The software also provides automation of labor-intensive processes. Complex calculations, decoding, reconciliation of reporting with the client's accounting base, general population analysis and sampling design are performed by the program automatically. Besides, data recorded in a certain working document is transferred to all associated working documentation without human involvement, which completely eliminates intentional or

accidental data inconsistencies. Mathematical validity of conclusions of the software is enabled by risk assessment, calculations and data analysis which are performed automatically according to algorithms based on the Theory of Probability, in reliance on the information received by the auditor during the audit.

The software requires no configuration and is ready for use, supplied with a ready-made audit methodology and all working documents. The procedures and the links with reference documents do not need setting up. However, if there are any questions, support service is available to all users with no additional fees or any special conditions. Support is provided by technical specialists, auditors and methodologists on any issue.

Other advantages of the software are the following. The client's accounting data can be loaded into the program for reconciliation with reporting, analysis, statistical sampling and filling in information in the working documentation. Data security is provided: all working documents, evidence files and internal company documentation are stored in a reliable program database with access rights setting, logging changes, encryption and automatic backup. At the same time, auditors can exchange data: when working in a network mode, all data is stored in a single database and is available to other users automatically. When working in a disconnected operation mode, auditors can exchange information through data import / export.

The software analyzes all the audit information and displays the results in a convenient visual form, which allows an auditor to make a reasonable conclusion. It has a flexible structure that allows advanced users to create various methods that ensure the implementation of the selected audit technology and provides not only ready-made methodology, but also the opportunity to create customized development based on parametric settings and references. In general, Audit XP is developed in accordance with ISA. The use of this software allows adhering to the corporate style in paperwork, increasing the efficiency of quality control of working documentation, ensuring compliance of activities with audit standards and corporate standards, and the built-in form editor enables creation the of new forms and changing of existing forms of audit procedures, or even completely changing the program to fit the internal standards of the organization. Application of the standards offered by Audit XP allows the organization to improve the professional level and quality of auditing due to the correct work organization.

3.1.3 AuditModern

AuditModern is Russian software for automating the activities of the Internal Audit and Control Service. The software provides risk-based internal audit, helps Internal Audit Service to operate in compliance with International Standards on Internal Auditing, and assists Internal Control Service with their activities. AuditModern takes into account the peculiarities of internal audit, internal control and the specifics of business in Russia/CIS. It accumulates the experience of internal auditors of leading companies, financial structures, banks in Russia and the CIS countries. The software is developed on a platform that provides convenient remote work of on-site auditors online and offline with no loss of functionality. As a part of increasing the efficiency and quality of internal audit, this software package offers a solution to create a methodological concept for an internal audit and control service either from scratch or at any stage of the service development. When implementing AuditModern, an exclusive methodology is applied in order to bring the activities and regulations of the service to a qualitatively new level. The structure of the software product is very simple and understandable and repeats the main stages of the work of an internal auditor.

Audit planning is one of the most important stages of an audit. At this stage, an optimal strategy and tactics for conducting an audit are developed, taking into account the individual characteristics of the enterprise. All risks of errors in the client's financial (accounting) statements are considered. The rationality of the use of labor resources, minimization of costs and the time of the audit depend on how well the auditor planned the audit. The auditing process includes checking the financial and economic activities of an enterprise, accounting statements, compliance with legislative norms. The process is performed within a specified time limits established in accordance with legislation, and at this stage tools are provided for auditing, collection, analysis and processing of the data obtained.

The communication stage contains a complete set of contacts, including internal and external ones, and provides opportunities to exchange information both within the internal audit service and within the organization as a whole, as well as with external users.

Monitoring includes a continuous process of observing and registering the parameters of an object in comparison with specified criteria, which is necessary in accordance with a risk-based approach to organizing internal audit; previous audit records are also stored.

Methodology makes it possible to take due account of any specific features of both the industry as a whole and a particular enterprise, and can significantly reduce the amount of

mechanical work. However, it is necessary to refresh and update the data in accordance with market changes.

As for the tools, given the fact of continuous development, it is required to update, adjust and configure software products on a going basis. The software allows an auditor to draw up an audit plan both for specific areas of the audit, and for the enterprise as a whole over various periods of time, at the end it will provide a report on the work performed, which contains elements of the final part of the audit, and will also ensure the safety and integrity of data.

Now this work will recap the programs that are under review, starting with the IT Audit software, which is designed to automate activities of the audit company in planning and conducting auditing. It is instrumental for quality control audit preparations, automatically fills in the auditor's working papers based on IC data and stores all files of working documents for the project.

The AuditXP software combines such important features as usability and versatility, provides complex automation of information input and processing at all audit stages. It offers an original method of auditing, contains built-in algorithms for calculations, planning, sampling analysis, selection of detected violations types and automatic drawing of conclusions by audit areas as well as a final conclusion.

The methodology of Audit Modern brings the activities and regulations of the internal audit service to a qualitatively new level taking into account the experience of internal auditors of leading companies in Russia and CIS, as well as in accordance with the International Standards for the Professional Practice of Internal Auditing.

3.2 Comparative overview of the IT-solutions functionalities

All the special audit programs reviewed above have been developed by Russian companies and are widely used today [38]. They ensure the effective conduction of both external and internal audits, with the exception of AuditModern, since this program is intended only for internal audit.[10, p.1-6] However, main features that play an important role in comparison are presented in this work. To make it clear and informative, a table 2.1 of basic descriptions and modules of the programs is made. In the table below, you will see three solutions analysed in the previous part and tabulated here.

Table 2. Descriptions and modules of the IT solutions

Software	Audit area	Description	Basic modules
IT Audit	Internal and external audit	Designed to automate planning and auditing activities of an audit company. Allows the company to prepare for the audit quality control; to automatically fill in the auditor's working documents according to 1C data; to store all files of working documents for the project.	Audit methodology; preparation of an enterprise audit program; automatic filling of working documents; sampling analysis in the audit program; preparation of the auditor's report; internal audit quality control.
AuditXP	Internal and external audit	The program combines such important qualities as usability and multifunctional performance, provides comprehensive automation of information input and processing at all stages of a general audit, offers an original audit methodology containing built-in algorithms for calculations, planning, sampling and analysis, selection of types of violations and automatic drawing of conclusions by audit areas and of the final conclusion.	Control block; audit of reporting; standard procedures; financial analysis; quality control; methodology block.

AuditModern	Internal audit	As a part of increasing the efficiency and quality of internal audit, a solution is proposed to create a methodological concept for the Internal Audit and Control Service both from scratch and at any stage of the Service's development. During the implementation, a methodology is applied in order to bring the activities and regulations of the Service to a qualitatively new level, taking into account the experience of internal auditors of leading companies in Russia and the CIS countries, as well as in accordance with the International Professional Standards of Internal Auditing.	Planning; audit; communications; monitoring; methodology; tools.

Then basic functions of these programs were taken that are demonstrative for comparison and interviewed users on the basis of a questionnaire as a research method. The principle was for the interviewees to range certain features on a scale of one to ten (if available). Next, users were asked to give their own comments on overall assessment, from the perspective of usability and efficiency of the software. The method of choosing criteria for the comparison were the following: those features were chosen that have significant influence on the quality of auditors work, such as, the accuracy in working with documents and tables, time-saving advantage that should be provided by such software, the lack of problems when working with various types of methodology, precision of calculation and data correctness and therefore low chance of errors and minimizing associated risks. Besides, one of the important questions was the overall experience of working with the programs, as not only should they

have high quality in terms of precision, low error rate and implementation convenience, but also be user-friendly so that auditors could adapt to working with these programs as efficiently as possible without hindering their activity. Table 3. shows the main features discussed:

Table 3. Usability and efficiency of the software

Parameter	AuditXP	IT Audit	AuditModern
Automated data entry from accounting programs and txt-files	9	5	6
special features allowing to use customized audit methodologies	7	6	6
implementation of the audit quality control function	9	9	9
forming expert opinions based on the results of the audit	8	6	6
creation of analytical reports	8	8	7
automated sampling	8	7	7
analysis of liquidity, profitability and break-even analysis	7	n/a	n/a
automatic filling of analytical tables for the analysis of financial and economic activities of enterprises	7	n/a	n/a

checking the correctness of the input data	8	n/a	n/a
processing of reports of other countries	n/a	8	n/a
allowing to identify and calculate the total amount of losses or benefits (actual and potential) for the company as a whole, based on the results of decisions found by auditors and recommendations made	n/a	n/a	8
Total value of all parameters	71	49	49

Additional comments of the users regarding each program were the following:

- Audit XP is an intuitive program that contains all necessary functionalities required for performing an audit. The interface is user-friendly, the customer support is almost unlimited.
- IT Audit is a program aimed at automating audit processes that copes with the task. However, it has an inconvenient interface, poorly configured database unloading, and the autocompletion of working documents does not always work correctly.
- AuditModern is intended for a risk-oriented internal audit. The information from the leading auditing companies accumulated here is helpful. But the interface is not so user-friendly and the support is not really operative.

The overall rating of the interviewees highlight that Audit XP software is the preferable solution both in regards to special features designed for auditing and general usability of the program from the point of view of users.

Having analyzed audit software both in theoretical and practical aspects, it should be noted that XP Audit is the most suitable, due to the fact that the largest number of audit procedures is automated in this program. It allows the creation of a working audit system aimed at solving audit problems at all stages of its implementation.

It has a number of advantages, such as automation of audit activities of not only large, but medium and small audit organizations, as well as individual auditors, in accordance with the

current federal audit rules (standards) and International Auditing Standards, increases the efficiency of quality control of working documentation, ensures the compliance of activities with audit and corporate standards. The application of the standards offered by this software improves the professional level and quality of auditors' work due to the correct work organization. The software introduced the ability to import and export procedures at all stages of the audit, which allows auditors to share responsibilities for auditing different sections, to work off-premise using laptops. It contains more than 500 procedures, forms, reference tables, reports on all stages of the audit. Another advantage is the availability of an original methodology for conducting an audit with multiple built-in algorithms. XP Audit includes an audit quality control methodology, a block of analytical procedures and financial analysis. The built-in editor of forms makes it possible to create new, modified forms of audit procedures, as well as completely change the audit program to fit the internal standards of the organization.

3.3 Description of IT-solutions support of auditing business-processes

While companies aim to improve their competitiveness in the conditions of uncertainty, they have to implement an increasingly flexible approach to working with resources. In order to achieve high results, it is necessary to move from the traditional method of business management to the process approach and to further automate business processes. The challenges of the new era, such as remote work and digital transformation, have significantly accelerated the transition of companies to the implementation of automation.[4, p. 10-18]

Business process management of a company is, first of all, control over the work of each business element, when organized actions of a person or a team effectively solve certain problems. Business process management means sequence control. The purpose of automation is to free up human and financial resources in the chain of actions by transferring mechanical work to the digital environment. That said, automation can affect almost any business process of a company.

The main goal is not to replace employees, but to free up their time for more important tasks that involve the application and development of skills. It allows the company to save resources either by reducing costs or by optimizing labor productivity. The time spent on performing cyclical actions of employees is saved. In addition, it allows the company to instantly and adaptively respond to changes in the business environment.

Automated solutions increase the quality of communication, the level of coordination and transparency of actions. It also enables the company to significantly speed up business processes by reducing time and allocating responsibilities at each stage, making it possible to solve several tasks at the same time. In particular, this includes the preparation of both internal and external audits. Working with documents is considered to be the most complex process at the enterprise, and the implementation of IT-solutions considerably simplifies it. Audit as a type of activity and a segment of the market in Russia is still relatively new, especially in comparison with accounting). However, its rapid development (an increase in the number of companies, their consolidation, expansion of the range of services they provide, etc.), the rapid growth of the legislative and regulatory framework, as well as the automation of the areas controlled by auditors (accounting and tax accounting), stimulates the implementation of automation.

However, even nowadays, when the importance of IT-solutions in improving business processes is difficult to overestimate, auditors often adhere to traditional solutions developed years ago, for example, using general-purpose programs (text editors, electronic tables, database management systems) that allow them to store and analyze the information of audited objects, perform simple calculations, reports, conclusions, but not always operate specialized audit programs to carry out their activities. For their work, auditors take information from regulatory documents, using reference and legal systems.

Advances in technology drive innovation across all industries: as technology evolves, companies from different sectors of the economy are adopting innovative approaches based on new technologies in their work. In this situation, it is necessary to ensure the effectiveness of processes and control procedures without reducing the speed of innovative development. This becomes possible only if companies and individual auditors start to use innovation in their activities.

Auditors can operate and evaluate IT-solutions, controls in new information systems and business processes based on modern technologies, only if they have enough skills to work with them, applying new approaches to auditing and using innovative tools when downloading data from information systems, conducting testing and preparation of reports. Internal audit services can also gain a more profound understanding of the company's risks if its activities are based on the effective use of tools for collaboration, data analysis and other technologies. With technologies playing an increasingly significant role in the activities of organizations, it is necessary to constantly improve the level of digital literacy

and competence of the internal audit service. The data expertise is equally important, since data forms the basis of all digital solutions.

A significant importance of IT-solutions in auditing business-processes, as described in this work, can be expressed by the following advantages. IT-solutions simplify the work of auditors, help speed up the processes of obtaining and processing information at all stages of an audit, which is possible only when using technologies.

On the software market, there are specialized programs that provide an audit methodology systematizing the implementation of audit procedures, the automation of complex and time-consuming operations through the analysis of data contained in the information databases of the customer's accounting. The use of such solutions makes it possible to reduce labor intensity and the error probabilities, which leads to a decrease in costs and an increase in the productivity of the auditor.

Thus wise, audit software makes it possible to draw up an audit program for individual business operations, for specific areas of accounting, for the whole enterprise in a given period, to draw up an audit report as the results of the work, to ensure the safety of working documents.

In addition, another advantage that IT solutions provide to business processes concerns personnel issues, which undoubtedly has long-term benefits. What this means is the employment of most advanced professionals both in audit organizations and in internal audit processes, as in the future the use of IT-solutions will become a standard procedure. In the long-term perspective, it will mean such strong points for the company as better risk management, ensuring the right balance of knowledge and skills to work with new technologies, improving the qualifications of personnel and inviting new specialists to maintain the pace of development set by the organization.

It will also help the organization to respond to risks on a real-time basis. Instead of annual preparation of plans and risk assessments, more frequent and flexible cycles can be needed, so risk assessments are conducted and the audit plan is revisited more often. It means that auditors do not wait until the end of the project to provide their opinion; they help their organizations to respond to risks in real time. In these cases, the auditor makes decisions during the audit process. The result of the audit rather depends on the professionalism of the audit team and the ability to use the opportunities provided by the software.

The most technologically advanced internal audit services are developing technology use and staffing models at the same time. The combination of these areas allows for the creation

of functions in which technological competence becomes the norm. This approach brings significant business benefits.[3, p.42-56]

With technology-driven innovation accelerating, it is increasingly difficult to predict what changes in competencies will be required in the next few years. However, one thing is clear: they must meet the needs of the company. The audit today has all the opportunities for rapid development based on the acquisition of new skills by auditors and the use of modern tools and techniques.

And another advantage is the impact on competition and resulting quality upgrade. The growing competition in the audit and consulting business motivates companies to find new ways to increase their efficiency. Subsequently, the companies search for solutions to improve the quality of services provided through the use of specialized software tools. Therefore, any difficulties in terms of audit automation can be resolved in the practical work of audit firms. After a while, auditors will find it difficult to work without specialized software, because its use allows them to reduce the time and costs of auditing, plan and control audits in a high-quality manner in the context of different industry specializations of clients, thereby increasing the competitiveness of audit companies.

Having considered the main means of IT-solutions support of audit business processes, in the implementation of audit activities, it is necessary to use special software that provides not only the possibility of progress in audit work, but also a high-quality result of auditing activities, qualitative improvement of personnel issues and competitiveness benefits resulting in better audit services. Summing up all the results of solutions comparison, we can safely say that at the moment the best solution for automating audit activities is the AuditXP program.

3.4 Applying the ISA methodology to the Audit XP program.

Focus on audit methodology in AuditXP software is needed in order to understand the principles of work with the program, its compliance with the related standards and a step-by-step approach that allows an auditor to perform the most efficient work and to meet all requests of the client's company and legislation of the Russian Federation.[19]

3.4.1 The stages of an audit

The AuditXP program is the implementation of the main principles of building an audit methodology based on the fullest use of modern automation tools. When it was developed, primary attention was paid to the unconditional fulfillment of all requirements of the federal rules (standards) of auditing activity. In accordance with the methodology adopted in this program, the audit of an enterprise is conventionally divided into several stages. The first four stages are basic:

- The first stage is preparatory. At this stage, information about the client is prepared, the nature of his business is studied and a decision to conduct an audit is made. The stage ends with the conclusion of the agreement;
- The second stage is audit planning. This stage includes the formation of the audit team and the creation of the necessary regulatory documents. The data of the reporting forms indicators are entered and the client's accounting database is integrated into the program. At this stage, the audit risks are determined, the materiality levels are calculated, and the general materiality level is itemized. The completion of this stage is the formation of the general audit plan and programs for audit sections;
- The third stage is carrying out substantive procedures and collecting audit evidence. This is the most time consuming stage of the work. At this stage, the programs are performed according to the audit sections selected, as well as the collection and documentation of audit evidence. The work program for the section is a list of all the required audit procedures. At this stage, additional procedures are also performed, determined by federal standards and current legislation;
- And the fourth stage is the final one. This is the stage of summarizing the results of the audit in all sections and preparing an official audit report. At this stage, an audit letter is drawn up to the auditee in a short form or in the form of a report.

The AuditXP program has a block of financial analysis of the company's economic activities, which allows an auditor to make a financial express analysis of the company's activities based on the indicators of the financial statements. The menu shows the entire structure of the program. A feature of the AuditXP program is its flexibility, allowing you to create various methods that ensure the implementation of the audit technology selected by the

auditors and use not only the proposed methodology, but also your own developments. The capabilities of the AuditXP program at all stages of the audit will be explored below.

3.4.2 The preparatory stage

Before starting the audit, the auditing organization should establish what the main objectives of the proposed audit are. Thereafter, the audit organization must determine whether it can carry out the project and whether it has a sufficient number of qualified specialists to solve the assigned tasks. In addition, auditors must ensure that they have sufficient experience in the client's business and are able to provide an objective assessment of the information received.[11] The actions that will be taken by the auditors for these purposes necessarily require documentation. To assess the feasibility of a project, the auditing organization should consider previously obtained information about the client. This information is data provided by the client, the conclusions of previous audits, information available in the media, and the Internet.

The essential step to obtaining information about a client is verbal information acquired at a meeting with a potential client. The results of the negotiations are recorded in the minutes. In the AuditXP program, in the section on organization of an audit, there is a protocol form that allows you to cover the main aspects of the client's financial activities. First of all, the auditor must determine the needs of the client and the need to provide additional services, for example, a tax audit. Once the scope of services has been determined, the timing of the audit should be agreed upon. The next block of questions is related to financial and economic activities. This information is needed in order to build an audit plan and program section by section.

In conclusion, the auditor needs to obtain information about the principles of managing the client's enterprise and evaluate its effectiveness. After receiving preliminary information about the client, the auditor can start analyzing it. At this stage, the audit organization should identify all possible problems that will be associated with this project, and assess possible ways to respond to them. If suitable answers are found, then the audit organization may decide to conduct an audit, otherwise it should abandon the project. While carrying out this procedure, the auditor should answer certain questions: determine significant changes that require additional protection measures, collect data that interferes with the observance of ethical principles, and confirm information on the possibility of performing work by own efforts. Upon completion of the procedure, the auditor concludes that it is possible to conduct

an audit in the form of one of three options: either cooperation is possible, or cooperation is impossible, or cooperation is possible, but changes need to be made to the audit letter. Based on the assessment and in accordance with the federal standard of auditing activity No. 12, the audit organization provides the client with an audit letter and receives the consent to the audit terms before starting work. The template of the audit letter and the contract can be taken from the reference book.

3.4.3 Audit planning

The next stage that starts after the preparatory one is audit planning. The purpose of planning is to draw up a general audit plan and programs for audit sections, taking into account the individual characteristics of an economic entity. Planning in AuditXP includes three groups of sequentially performed operations: preparation of administrative documents, input of accounting forms, calculation of risks and materiality. After their completion, an overall audit plan and programs by section can be drawn up.

Planning begins with determining the audit team and appointing a leader. It can be a specialist with an auditor's certificate and at least five years of experience as an auditor. Besides, there are such specialists in the audit team as auditors, experts and supporting staff. The members of the team are determined by the specifics of the audited enterprise, as well as the timing of the audit specified in the contract. Each employee included in the audit team must sign a questionnaire which makes the auditor personally responsible for their independence and objectivity.

After the formation of the audit team, a quality inspector should be appointed. It can be either an employee of the internal quality control department, or an auditor who is not involved in this audit. The latter is most often practiced in small audit firms. For the preparation of administrative documents, the document reference contains the templates of an inspection order, a quality control order, an employee independence questionnaire, an audit organization independence questionnaire. The entry of accounting forms can be done manually or automatically through the import of xml-files. To work with the client's accounting database, the AuditXP program has a converter that allows you to work with accounting software. The converter can also load data from MS Excel and dbf files. A posting log and account balances, expanded by analytical criteria, are selected from the accounting database.

The use of computers and modern information technology is typical for most organizations. The audited organizations may use different accounting software; nevertheless, the majority of accounting software has similar functional characteristics, such as an accounting posting log, a modifiable chart of accounts, reference books of analytical characters, and a reporting on transactions and turnovers, in the context of accounts and analytical characters. Accessing the accounting database directly from the audit software allows you to effectively solve the following tasks:

- Account breakdown by comparing the reporting indicators and the data of accounting registers;
- Sampling by accounts by calculating the general population;
- Sampling population both in terms of balance and turnover using various methods (continuous, random, stratification, monetary);
- Selecting the key elements and elements of the highest value that should be checked in a continuous method;
- Receiving the groups of transactions based on specified analytical characters;
- Autocompletion of working papers of substantive procedures;
- Conducting financial analysis of economic activities.

In AuditXP, data conversion starts with choosing a database type. In addition to the forms of financial statements, the turnover balance sheet is entered into the program. In order to understand the client's activities, it is necessary to get acquainted with their accounting base: accounting items and business transactions. The first document that needs to be studied in detail is the turnover balance sheet. It must be studied at the same time as the account analytics. When analyzing the turnover balance sheet, the auditor receives information about the accounting items, their number and value. The information about the most significant items to be checked can be obtained, as well as about the items that are not advisable to check. By studying the turnover balance sheet, an experienced auditor can see all the details of the company's financial activities:

- The degree of depreciation of fixed assets and the refresh rate;
- The amount of inventories;
- Receivables and payables;
- The volume of export-import operations;
- The amount of loans;

- The amount of own funds in liabilities;
- The tax burden;
- The rate of wages;
- Distribution of net profit, etc.

It is important to input intermediate forms of balance and profit and loss statements into the program. This data allows you to analyze quarterly dynamics of changes in the financial indicators of an enterprise when conducting a financial express analysis. The study of the analysis results is an integral part of the analytical procedures.

Next, an auditor assesses the risks of material misstatement of information. In accordance with the federal standard of auditing activity No. 12 "Understanding the activities of the audited entity and assessing the risks of material misstatement of information", the auditor must identify and assess the risks of material misstatement at the level of accounting statements as a whole and at the level of specific prerequisites for the preparation of accounting statements for groups of similar transactions, account balances and disclosure events in accounting statements. For this purpose, the auditor identifies risks in the process of familiarization with the activities of the audited entity and its environment, establishes the correspondence between the identified risks and the kind of information that may be misstated at the level of accounting statements, considers whether the risks significant enough to lead to a material misstatement. The risk of material misstatement is the risk that there are errors or fraud of the management and (or) employees of the audited entity and includes two components: inherent risk and control risk. To quantify the risk of material misstatement, AuditXP uses a test system developed and adopted by the auditing organization.

Audit risk has three components: inherent risk, control risk, detection risk. Inherent risk expresses the auditor's expectation of the reporting error probability that exceeds the permissible value, before checking the internal control system. When assessing inherent risk, such groups of risk factors should be considered as external factors, nature of activity, financial indicators, financial activities, accounting considerations, and the overall strategy of the organization. The built-in algorithm of the AuditXP program automatically calculates risks.

Control risk is the risk that a misstatement may not be prevented or detected and corrected in a timely manner by means of accounting and internal control systems. Typically this value

ranges from 0.3 to 0.5. To calculate control risk in this methodology, tests have been developed containing questions on certain groups of indicators: information system, control environment, control actions, monitoring of controls, risk assessment. Control risk is calculated in a similar way as inherent risk. And detection risk expresses the auditor's readiness to recognize the probability of non-detection of errors exceeding the permissible value. According to statistics, this risk is about 0.1 (about 10%).

Inherent risk and control risk are independent of the auditor, and the auditor cannot influence these risks. Therefore, it is very important to objectively assess these risks in order to minimize detection risk and plan the audit correctly. In assessing detection risk, though, the auditor should pay attention to a number of aspects, considering such possibilities as incorrect assessment of the accounting and internal control systems of the audited entity when collecting information for planning purposes, incorrect focus on certain financial transactions of the audited entity, incorrect sampling, the impact of deficiencies in the audit firm's management system on the auditor's conclusion, and the existence of deficiencies in the management and control of the audit team.

After calculating the values of all three components of audit risk, it is automatically calculated in the corresponding procedure. It should be noted that the content and number of questions in the risk tests can be supplemented and adjusted by the auditor, depending on the specifics of the economic activity of the enterprise.

Having obtained the value of the audit risk quantity, it is necessary to take into account its reasonableness. Acceptable audit risk expresses the auditor's readiness to recognize the acceptable probability of material errors in the financial statements after the audit is completed and issuing an unqualified opinion. Most auditors believe that the acceptable audit risk should not exceed 5%, although there is no formal regulation on the maximum value of audit risk.

Calculation of the materiality level is another important step. The selectivity of audits necessitates credibility assessment of financial statements only in the aspect of materiality. A misstatement or error in the financial statements is material if its magnitude can affect the economic decisions taken by the users of these statements. To calculate the materiality level, the data of the balance sheet and the statement of financial results are used, as well as the data of audit risks calculations. I suggest to point the following indicators of financial statements are used as basic:

- Fixed assets;

- Equity;
- Current assets;
- Receivables;
- Long-term and short-term loans and borrowings;
- Accounts payable;
- Sales revenue;
- Expenses;
- Other income;
- Other expenses;
- Total balance.

To calculate the level of materiality, both indicators of the current period and averaged indicators of the current and previous periods can be used. The average indicators of the current period can be used, for example, when in the current period there have been significant changes in the organization's business, and the indicators for the current period and the period preceding the reporting period turned out to be incomparable. Each indicator has a share of materiality as a parameter. It is a key parameter that determines the overall level of materiality. There is an inverse relation between the materiality level and risk: the higher the materiality level, the lower the overall audit risk is, and vice versa.

In the AuditXP software, the calculation of the general materiality level is performed automatically in the procedure “Determination of the general materiality level”. If the audit is carried out in several stages, when planning at the first stage of the audit, a preliminary materiality level is calculated. It can be updated during the subsequent stages. At the final stage of the audit, the overall materiality level should be calculated.

After calculating the general level of materiality, its value should be allocated by accounting components. Currently, there are two checking methods, either by reporting indicators or by accounting records. In the first case, an accounting component is a specific item or a group of similar items in the accounting statements. In the second case, it is the account balance or turnover. AuditXP allows you to select any of these options. To form an opinion on the reliability of the financial statements as a whole, the auditor must be convinced of the reliability of each component of the financial statements. The criterion of reliability is the level of component materiality. It represents the error amount permissible for this component.

In the AuditXP software, the materiality level allocation by components is performed automatically in the relevant procedure. For balance sheet figures, the level of components materiality is proportional to the share of a component in the balance sheet total. After the program has allocated materiality, the auditor must analyze the result and manually make the necessary adjustments.

Some of the components of the accounting statements, based on the professional judgment of the auditor, can be excluded as immaterial. The determination of the level of materiality in relation to individual components of the financial statements may also be skipped if these components are significant for users, regardless of their values and any misstatement can significantly affect the decisions (authorized capital, shares purchased from shareholders and other aspects of the financial and business activities of an economic entity).

It is impossible to check a number of accounts according to the level of materiality established by the baseline indicators. This can be applied to either accounts with no balance as of the date of the report, but with significant turnover for the audited period, or with an insignificant account balance, or with turnovers exceeding the account balance by 10 times or more. The share of materiality for them, calculated from the account balance, is either very small or non-existent when the account balance is equal to zero. In this case, the auditor must check an unreasonably large volume of documentation, since most transactions on these accounts contain amounts in excess of the calculated materiality level. The materiality level of such accounts is established from the turnover value. Performance materiality is established based on the maximum permissible deviation of 3%.

After completing the work described above, the auditor can proceed with planning, drawing up a general audit plan. The main planning document is a general audit plan. The general plan should ensure that the auditors' work is organized, including the preparation of audit programs and the assignment of responsibilities during the audit. In accordance with federal rules of auditing activities, the general audit plan should contain the expected scope and procedure for conducting an audit. When drawing up a general audit plan, all types of work should be indicated at all stages of the audit, starting with a meeting with the client's management at the preliminary stage and ending with negotiations with the client's management about the audit results at the final stage. Therefore, the general audit plan should be structured by audit stages.

The plan indicates a head of the audit, appointed by order of the director of an audit organization. For each planned type of work, a responsible executor must be appointed and

a deadline must be determined. The most important element of internal audit quality control is control over the plan and the actual timing of its implementation.

The next element of the general plan is the assessment of the labor intensity of each type of work. In the AuditXP software, a standard list of work at all stages of the audit is developed and the complexity of each procedure is determined. When a specific work is performed, the date of its completion is immediately reflected in the plan.

3.4.4 Carrying out substantive procedures and collecting audit evidence.

The next stage of an audit includes carrying out substantive procedures and obtaining audit evidence. The substantive step of the procedure is a list of the sections that will be checked during the audit. For each section, its own program should be developed. A section audit program is a set of audit methods and techniques, documented in a specific form. It includes a list of audit procedures for checking a specific section, as well as their nature, timing and performers. The section audit program is an instruction for assistants and a means of quality control of the audit team work, since it contains a description of the procedures and the timing of their actual implementation.

The main objectives of the audit program include giving a detailed presentation of the audit procedures required to perform an audit of each section, distributing responsibility among the members of the working group, making the connection between the test stages, and recording the performance of certain audit procedures. These objectives should be kept in mind when working with the program, as the program corresponds to the requirements providing necessary features for each audit section.

The audit program for each section consists of three parts: general procedures, substantive procedures, and final procedures. The first part specifies the procedures aimed at collecting information on the effectiveness of the internal control system and the accounting system and clarifying the control risk in the audited section, such as document request, test of controls, and analysis of accounting policies. To analyze the correctness of the formation of financial statements, the first section includes the procedure for decoding the item of the balance sheet, and the reconciliation of indicators in the financial statements and accounting registers. The first part is completed by the procedure for sampling calculation and sampling population. The second part of the program contains substantive procedures for obtaining audit evidence by assertions. The third part of the program contains the final procedures for

a specific section. These include the formation of a detected violations list and conclusions about the reliability of the financial statements indicators checked in this section of the audit. In AuditXP, in all audit programs for a section, autocompletion of labor coefficient, materiality, audit risk, as well as the names of the head of the audit and the responsible executor of this section are provided. When drawing up a plan for a section check, the responsible executor determines the specific executors for each procedure and the deadline for its implementation. When performing the check, it is recommended to adhere to the sequence indicated in the work program. The section program also shows the audit progress. After the completion of the procedures specified in the program, the date of their actual implementation is automatically set.

When obtaining audit evidence using tests of internal controls, the auditor should consider the sufficiency and propriety of that evidence to confirm the assessment of the controls risk level. To do this, it is necessary to assess the reliability of the internal controls of the audited entity, in order not to increase the audit risk as a result of a decrease in the audit scope. The mandatory aspects for the assessment during the audit are the accounting and internal control systems of the audited entity, which ensure the prevention and (or) detection and correction of material misstatements.

In the AuditXP software, tests have been developed for each section, containing questions on the internal control system and the accounting system. At the planning stage, a risk assessment of controls for the enterprise as a whole was carried out. Each area of accounting has its own characteristics and, as a result, its own internal control system reliability. Tests of controls in specific sections help clarify the risk of controls and the related materiality.[16] One of the audit areas is checking the correctness of the accounting policy items selection and its compliance with the legislation. Customer compliance with accounting methods and accounting policies can only be verified by examining a specific section of the audit. For this reason, in AuditXP, there are accounting policy tests in each audit section.

The next very important audit procedure is account breakdown and the reconciliation of indicators in financial statements and accounting registers. Each balance sheet item is formed from the balance of an account group. The auditor checking the statements must know which account has formed a certain indicator. By comparing the amount of account balances and the value of the reporting indicator, the auditor can establish the reliability of this indicator. The algorithm of the procedure implemented in AuditXP also allows you to obtain the number of analytical characteristics in the balance of a particular account. Having obtained

such information, the auditor can choose the sampling option: by balance or by account turnover. Similarly, each profit and loss statement item is formed from the turnover of accounts. The analysis of profit and loss statement items is carried out according to the same rules and with the same result as the analysis of the balance sheet. All operations are carried out automatically in the AuditXP software.

Another feature includes working with the audit sampling calculation, which is, on the one hand, a part of the planning stage, and on the other hand, it is performed before starting work at the auditing stage in each of its sections. In addition to control risk and inherent risk, a risk degree indicator attributed to "overlapping procedures" can be used in the calculations. Overlapping risk arises from the fact that a mistake made in accounting entries or in the calculation of amounts can lead to a number of misstatements in other accounts. "Overlapping procedures" allow the set of primary documents to be studied in connection with documents related to another section of accounting. Thus, audit risk can be reduced if the reliability of accounting data from one accounting area is confirmed by verified data from another one. And, conversely, the shortcomings of one accounting subsystem can have a significant negative impact on other subsystems, as well as on the reliability of financial statements in general. In the AuditXP software, the calculation of the audit sampling size is performed in each of the audit sections. After specifying the risk of controls for a specific section, the materiality is recalculated and updated. For this value, the sampling size is calculated both for account balances and for their turnovers.

To meet the test goals, it is also necessary to determine the relevant test population. Tested population is the entire set of certain items. The audit items can be accounting records (transactions and balances), records and underlying documentation used for sampling. To compile the test population, the client's documentation is divided into uniform data arrays according to various characteristics (the nature of the documents, financially responsible persons, time sequence, etc.).

While performing sampling, the auditor can divide the entire population into separate groups and items with similar characteristics. Usually the sampling should be representative. This means that all elements of the target population are equally likely to be selected for the sampling. In AuditXP there are two options for constructing a sample population: by turnover and by account balance, while the sampling representativeness is ensured by one of the selection methods: random selection, stratification, monetary selection, block selection. If the number of items is large enough, the stratification method is more preferable.

To build a sample population, accounting records are sorted by amounts and divided into homogenous groups called strata. A random sample from each stratum is taken in a number proportional to the stratum's size when compared to the population. Errors in the group are not applied to the entire population. From the rest of the items, a sample population is built using the method chosen by the auditor. The auditor has the right to resort to non-representative sampling only when the auditor's professional judgment based on the results of the sampling should not apply to the entire population as a whole. For example, when the auditor checks a certain group of transactions or a class of transactions where possible errors have been identified.

For any sampling, the auditor must analyze each error in the sample and extrapolate the results obtained from the sample to the entire test population. The auditor should ensure that the error in the audited population does not exceed the acceptable value. To do this, the auditor compares the population error obtained through propagation with the tolerable error (materiality). If the first error turns out to be more tolerable, the auditor should reassess sampling risks, and if they are considered unacceptable, then the auditor should expand the range of audit procedures or perform alternative audit procedures.[1, p.11-13]

To extrapolate the typical errors of the representative sampling, the auditor should divide the sum of errors found in the representative sampling by the total value of the checked items of the representative sampling and multiply the result by the total value of all items of the population. As a result, the estimated value of errors will be obtained based on the results of the representative sampling. The total estimated error amount from the sampling test is the sum of the estimated error amount from representative sampling, added to the actual found error amount by the most valuable items and key elements. If the total estimated error amount obtained from the sampling is a fraction of the materiality level, the auditor may require the representatives of the audited entity to make corrections only of the errors actually found. If the overall estimated error amount obtained from the sampling is close to the materiality level, and especially if the sampling checks carried out in different accounting areas add up to an error that is comparable or exceeds the materiality level, it is recommended for the auditor to take the following actions:

- Require the client to correct the errors actually found; analyze the causes of errors and assess the possible amount of errors not found;
- Modify audit procedures in order to obtain more reliable data (for example, increase the sampling size);

- Try to perform any alternative audit procedures in relation to this section of accounting;
- Require the client to correct not only the detected, but also other possible errors in this accounting area, then selectively check other elements of this accounting section again.

If the audited entity has not corrected the actual errors identified, then, taking into account the results of the procedures undertaken by the auditor in accordance with the recommendations described above, the auditor should consider preparing an auditor's report based on the results of the audit, other than a clean report. In addition to calculating possible errors, the AuditXP software calculates the extreme value of the expected error.

To obtain the necessary audit evidence, the auditor performs certain actions (reviews documents, compares them, makes calculations, interviews employees, etc.) during the site inspection. These actions, carried out by the auditor in a certain order, are called audit procedures. Depending on the nature of the actions carried out by the auditor, there are actual, documentary, analytical procedures, procedures for compliance (control), substantive procedures, sampling procedures. Since the purpose of the audit is to search for evidence of reporting reliability, then to draw up the list of audit procedures, it is necessary to proceed from assertion. It directly determines the required procedures.

Assertion can be grouped into the following categories: either related to business transactions and events in the reporting period or related to the account balance at the end of the reporting period. Below there is the definition of the categories and the procedures that may or may not confirm the accuracy of the reporting, and include accounting entries, assets, liabilities, and capital here.

Accounting entries imply:

- Incurrence, which means that business transactions and other accounting events are related to the activities of the audited entity: checking the availability of documents and the correctness of their execution upon acquisition of assets;
- Completeness, which means all business transactions and other accounting events to be recorded are actually recorded: checking the availability of documents and the correctness of their execution upon acquisition and disposal of assets;

- Accuracy implies that the amounts and other data related to the business transactions and other accounting events are recorded properly: compliance test of the value of acquired and disposed assets with primary documents;
- Reference to the corresponding period refers to business transactions and other accounting events that are recorded in the corresponding reporting period: checking the recording of business transactions in the corresponding reporting period;
- Classification means that business transactions and other accounting events are recorded in the relevant accounts: checking the correctness of accounts for business transactions recording.

Assets, liabilities, capital (balance) imply:

- Existence, providing that the assets, liabilities and capital recorded in the accounting actually exist: inventory taking, testing of the object's compliance with the requirements of this asset, checking the availability and correctness of primary documents, sending requests to debtors (creditors) for debt confirmation;
- Rights and obligations, meaning the audited entity has the rights or controls the rights to the recorded assets, and recorded obligations represent the obligations of the audited entity: checking of contracts confirming the rights to assets;
- Completeness presumes all assets, liabilities and capital that are subject to accounting are recorded in it: inventory taking;
- Valuation and Allocation means that assets, liabilities and equity are included in the financial statements in the appropriate amounts, any resulting estimates and adjustments are recorded correctly: checking the correctness of the total valuation of the asset in accounting and compliance with legislation and accounting policies, checking the correctness of depreciation, checking the correctness of the asset revaluation due to its depreciation or the use of reserves.

Some of these procedures are repeated for different assertions. The results of the procedures performed in AuditXP are formalized in working documents. Their form contains the name of the control procedure, the purpose of the control procedure (assertion), instructions for the execution of the procedure, a list of documents and operations where violations were revealed, a description of the violation and references to regulatory documents. All audit procedures are provided with classification numbers, allowing the auditor to make references in the audit program and draw up the working documents. The working documents provide

for the possibility of a detailed description of the detected violation. In addition, files with photographs of documents, documents created in MS Word or Excel, as well as audio recordings of interviews can be attached to a working document. The program uses working documents to formalize such procedures as a request, a confirmation, an inspection and a recalculation.

After completing the substantive procedures, it is necessary to summarize the audit by section. To do this, the AuditXP software automatically generates a list of detected violations for all procedures in the section and comments to them. If the identified violations are corrected and changes are made to the reporting before the issuance of the auditor's report, a note on the correction will be made in this list.

The audit results are recorded in the final procedure. The conclusions of the section contain information on the procedures performed and the associated assertions, a list of uncorrected misstatements and comments to them, as well as the results of the selective tests analysis. The possible error amount of the general population is compared with the significance of the reporting indicators related to the section, and a conclusion is made about their reliability. Now, there are federal standards and regulations of auditing that require consideration of various aspects of the financial activities of the audited entity. In the AuditXP software, in accordance with these standards, there are the following procedure tests:

- Verification of compliance with regulations;
- Review of errors and fraud;
- Estimated values;
- Comparable data in accounting (financial) statements;
- Audit of related parties transactions;
- Actions after the reporting date events ;
- Anti-money laundering;
- Anti-corruption.

Not all of these procedures are carried out by the auditor, as some operations in the enterprise might be lacking, for example, transactions with related parties or events after the reporting date. Nevertheless, there are procedures that must be carried out without fail. The auditor inputs ready-made estimates in the working documents, which were received on the basis of the completed procedures: inquiries to the management, analysis of previous reports and financial statements. For these purposes, information obtained at the stage of collecting

information may be used, as well as additional audit procedures may be performed. The conclusions of the auditor are reported in this procedure and in the auditor's report. Tests of other procedures are carried out in a similar way.

3.4.5 The final stage

At the final stage of an audit, the analysis of the audit results of all sections is performed, the financial analysis is carried out according to the indicators of the reporting forms, an auditor's report is drawn up, and a letter (a report) to the client is made.

After carrying out the procedures, generally, the auditor receives the final documents for each checked section. To form an opinion on the financial statements reliability, the auditor needs to see the broad picture of the audit and analyze the found misstatements, correlating them with the general level of materiality. To do this, the auditor can use the pivot table in AuditXP, where the table is made up automatically. The internal standard implemented in the program provides for the following options for the recommended forms of conclusion, depending on the ratio of the general level of materiality and total misstatements. Thuswise, if misstatements of the reporting do not exceed any of the materialities of each item, the auditor issues an unqualified audit opinion. If there is an excess of the materiality of certain items, but the total amount of misstatements is less than the general level of materiality, the auditor issues a modified opinion. If the total amount of misstatements exceeds the general level of materiality by less than 10%, the auditor issues a modified opinion. And if the total amount of misstatements exceeds the general level of materiality by more than 10%, the auditor issues an adverse opinion.

When deciding on a particular form of conclusion, the auditor can use a ready-made template. The AuditXP program provides the following types of conclusions corresponding to the opinions mentioned above, such as a clean audit report, a qualified opinion, an emphasis of matter, an adverse opinion, or a disclaimer opinion. After filling out the template, the form can be uploaded to MS Word for final editing.

An audit letter to the audited entity can be issued either in the form of a brief or in the form of an audit report. To compile a detailed report, the program provides a special constructor that allows you to automatically create a multi-page document that can be a basis for the report.

Thus, the methodology of the audit related to the features presented by the Audit XP software has been reviewed here. In order to look at the program in detail from a technical point of view, the architecture of this software will be presented in the next chapter.

3.5 Audit XP Reference Model

Next, the work proceeds with the building of a reference model. A reference model is a representation of concepts, objects and relationships between them in a certain area. On the basis of the reference, more specific and detailed models are built, as a result, embodied in real-life objects and mechanisms. In this work, a reference model for the Audit XP solution will be applied.

3.5.1 Building a reference model of the company's IT architecture

This architecture of the software product presented in Figure 1. was built based solely on my own experience working with it.

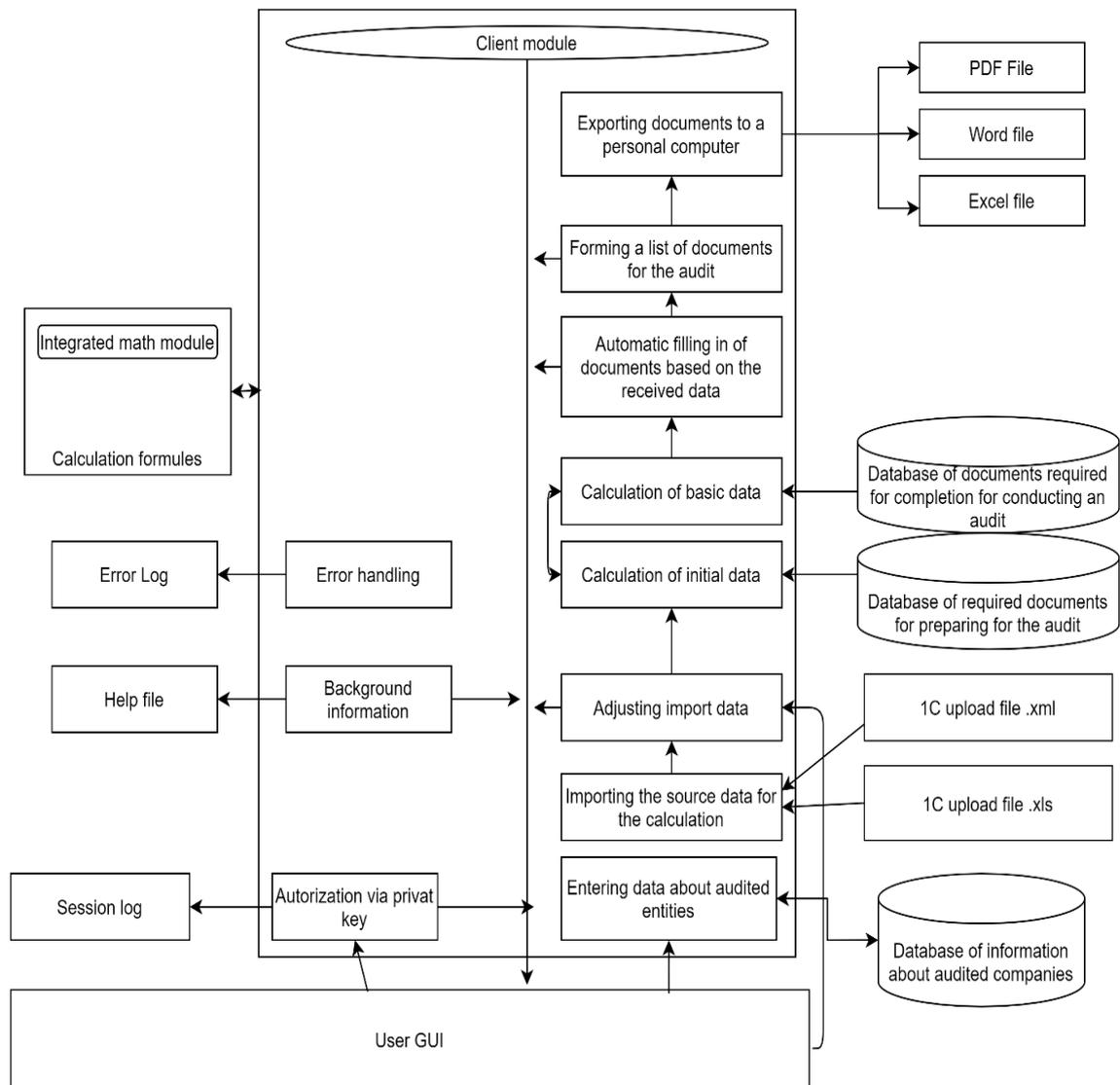


Fig. 1. - architecture of the software product

3.5.2 Operating principles of Software

So, the step-by-step operations of the program are the following.

1. After payment has been processed, a personal key is generated for a user. By using the key a user can enter the program installed on a user's workstation.
2. The user enters the audited entity data into specially prepared forms, shown in Figure 2. At this stage the first phases of automating the document autocompletion process are in the program. The entered data forms the client's databases. Subsequently, the auditor's working documents will be filled in with the initially entered data.

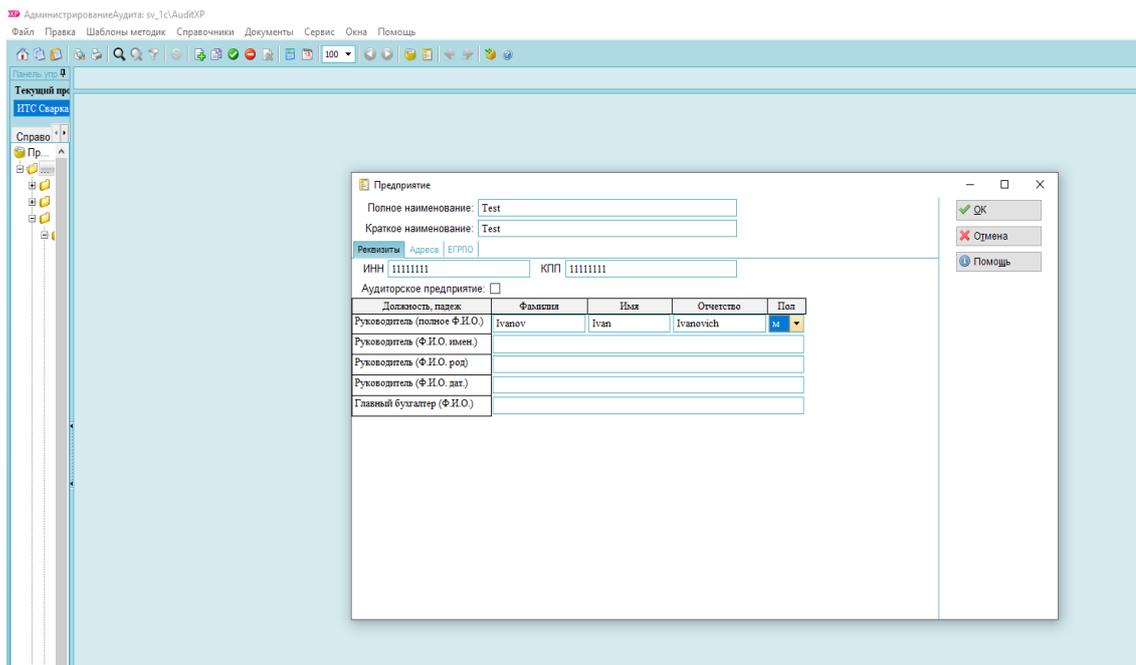


Fig. 2. Filling the basic data

3. Upon completion of the form about the enterprise, the following form - "a project" - is filled in, see Figure 3.

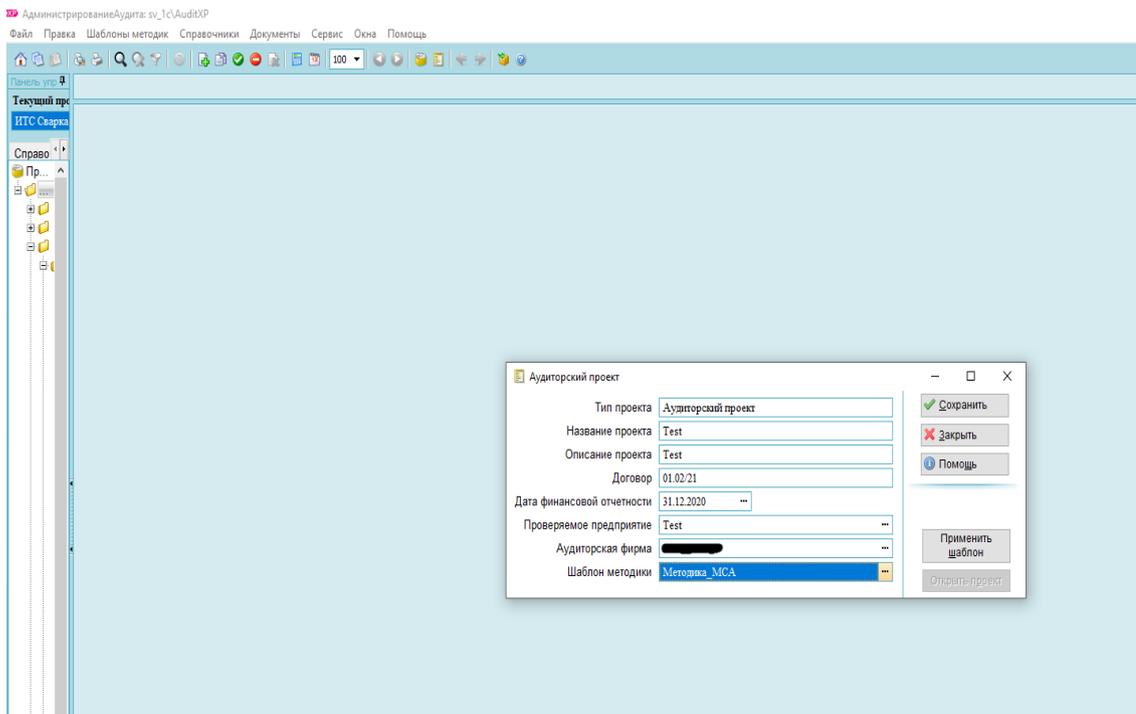


Fig. 3. Project data filling

4. Then a user, having downloaded the data from the accounting program using an external processing file (Figure 4.), imports data from the 1C accounting program. The import is configurable, i.e. a user indicates what kind of data is needed (period, account numbers, specific transactions, etc.), that is shown in Figure 5.

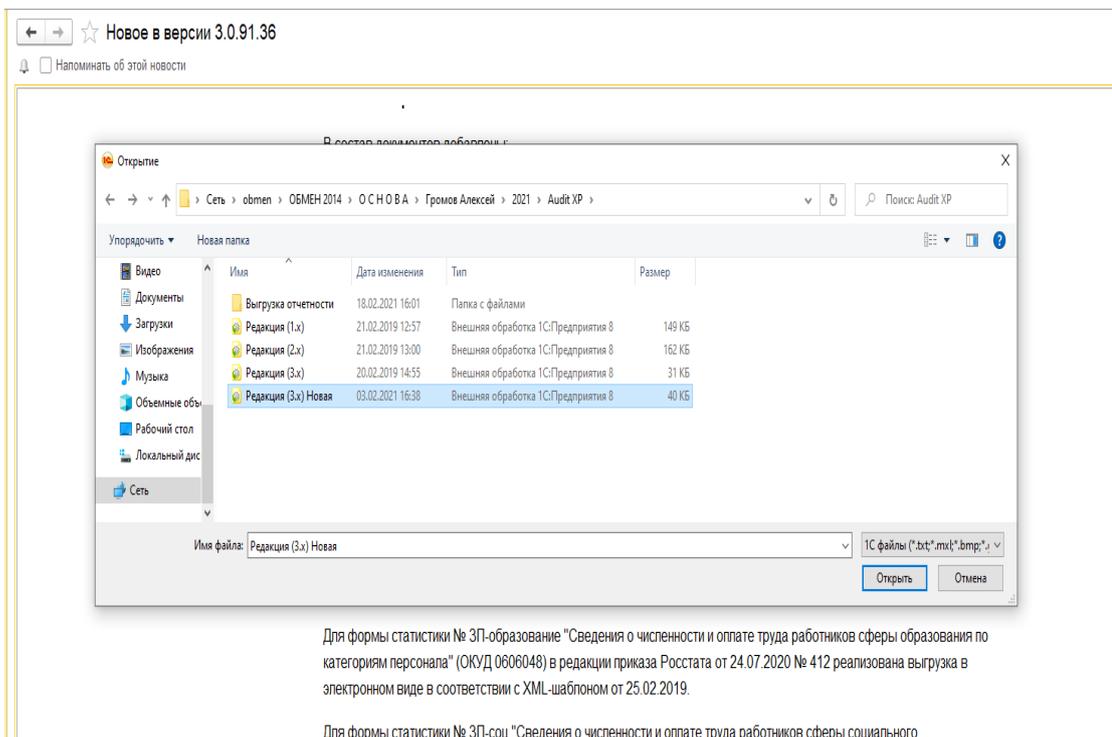


Fig. 4. External processing file

← → **Выгрузка данных в программу AuditXP (версия 2.0)**

Организация: [] x

Журнал проводок с: 01.01.2020 по: 31.12.2020 Аналитика сальдо на: 31.12.2020

Дополнительные настройки

Путь для выгрузки Журнал проводок: C:\Выгрузка_в_AuditXP\..._проводки.cdr

Путь для выгрузки Аналитика сальдо: C:\Выгрузка_в_AuditXP\..._сальдо.cdr

Техническая поддержка:
e-mail: support@auditxp.ru
Телефон: +7(495) 781-02-22

Выгрузить журнал Выгрузить сальдо

Выгрузить все

Fig. 5. Importing data from 1C application

5. The next step is to upload this imported information in the .cdr format, as shown in Figure 6., into the audit automation program. This file is automatically checked for compliance by the internal control module. If everything is successful, then this data in the program can be used, if the data is invalid, then the program will reject the file.

6.

Ввод форм бухгалтерской отчетности					
Клиент:	Test				
Контракт №	01.02/21	Исполнитель:	...	Завершена:	...
Аудит отчетности на:	31.12.2020	Проверяющий:	...	Проверена:	...

Импорт из 1С:Предприятие 7.7	Импорт из 1С:Предприятие 8	Импорт из Excel	Импорт из Турбо 9 / X	Импорт из Excel(SAP/ИБ)
------------------------------	----------------------------	-----------------	-----------------------	-------------------------

Коррекция CRD файла

Журнал проводок (*.Crd)	C:\Выгрузка_в_AuditXP\Сагурн_ооо_проводки.crd	...
Аналитика сальдо (*.Crd)	C:\Выгрузка_в_AuditXP\Сагурн_ооо_сальдо.crd	...

Fig. 6. Exporting .cdr file

7. So, by this step, there is all the outside information from the client, this is the data of the legal entity entered in step 2, as well as the importing of the accounting database obtained in step 3. At this stage, the auditor begins filling out working documents. Some of them are filled in automatically, which is demonstrated in Figure 7., due to the integrated mathematical module with ready-made mathematical formulas customized for a specific document. Most of the auto-filled documents during the check are sequential, so not to miss a single working document during the check.

Рабочий документ | Прикрепленные документы

Наименование процедуры | Общий уровень существенности

Дата баланса | 31.12.2020

Существенность на отчетную дату
 Существенность по средневзвешенным данным

Расчет по балансу

Контрольный показатель	Выбор	На начало периода, руб.	На конец периода, руб.	Доля, %	Значение, руб.
1 Прочие доходы и расходы	<input checked="" type="checkbox"/>	138000	141000	4	5640
2 Прочие расходы	<input checked="" type="checkbox"/>	138000	141000	4	5640
3 Кредиторская задолженность	<input checked="" type="checkbox"/>	110000	152000	5	7600
4 Прибыль до налогообложения	<input checked="" type="checkbox"/>	161000	299000	5	14950
5 Затраты	<input checked="" type="checkbox"/>	2636000	2791000	2	53820
6 Выручка от продажи	<input checked="" type="checkbox"/>	2955000	3231000	2	64620
7 Дебиторская задолженность	<input checked="" type="checkbox"/>	2094000	2386000	6	143160
8 Оборотные активы	<input checked="" type="checkbox"/>	10094000	2416000	6	144960
9 Валюта баланса	<input checked="" type="checkbox"/>	10094000	10373000	2	207500
10 Собственный капитал	<input checked="" type="checkbox"/>	9984000	10223000	5	511150
11 Внеоборотные активы	<input checked="" type="checkbox"/>	-	7959000	10	795900
Общая существенность для отчетности в целом					178000
Факторы, которые были проанализированы при выборе контрольного показателя и применяемого процента для определения уровня Общей существенности. (элементы финансовой отчетности, характер организации, структура собственности и способ финансирования, относительная изменчивость избранного контрольного показателя и др.).					
Ожидание искажений, % (от 50 до 90%)					90
Обоснование выбора ожидания искажений					Так как уровень риска по финансовой отчетности в целом был определен как средний, мы выбрали среднее значение ожидания искажений.
Рабочая существенность для аудиторских процедур					160000
Порог незначительности, % (от 3 до 10% от существенности отчетности в целом)					10
Обоснование выбора уровня применяемого процента для уровня незначительности					Порог незначительности выбран средним, так как уровень риска по финансовой отчетности в целом был определен как средний. Руководство и лица, отвечающие за корпоративное управление ожидают, что их будут информировать об искажениях, величина которых составляет приблизительно 5% общего уровня существенности.
Явно незначительная величина					17800

Fig. 7. Autofill form

8. As the auditor fills in working documents, he can see the progress of the process live. The filled in documents are marked with a symbol (X) in the program, and also vice versa, as shown in figure 8.

I. Предварительная работа							
Индекс	Наименование работ / документов	Исполнитель	Норма	План	Факт		
Принятие аудиторского задания							х
Z110	Письмо соглашения прикр.	...	1	...	11.12.2020		х
Z102	Протокол встречи	...	0.5	...	02.12.2020		х
Z103	Проверка информации о клиенте	...	0.5	...	03.12.2020		х
Z104	Принятие решения о начале и (или) продолжении работы с клиентом	...	0.5	...	03.12.2020		х
Z106	Соблюдение Правил независимости	...	0.5	...	04.12.2020		х
Z109	Договор прикр.	...	1	...	11.12.2020		х
Подготовка распорядительных документов							х
Z110	Формирование аудиторской группы	...	0.2	...	14.12.2020		х
Z111	Приказ о проведении проверки и составе аудиторской группы	...	0.3	...	14.12.2020		х
Z112	Назначение лица, ответственного за проверку качества выполнения задания	...	0.3	...	15.12.2020		х
Z113	Принятие ответственности руководителем задания	...	0.2	...	15.12.2020		х
Z114	Подтверждение независимости членов аудиторской группы	...	0.5	...	16.12.2020		х
Z115	Письмо об указании ЛОКУ	...	0.2	...	16.12.2020		х
Z116	Определение ЛОКУ	...	0.2	...	17.12.2020		х
Ввод форм бухгалтерской отчетности							х
Z130	Конвертация бухгалтерской базы	...	0.5	...	22.02.2021		х
Z131	Баланс	...	0.2	...	22.02.2021		х
Z132	Отчет о финансовых результатах	...	0.2	...	22.02.2021		х
Z133	Отчет об изменениях капитала	...	0.2	...	22.02.2021		х
Z134	Отчет о движении денежных средств	...	0.2	...	22.02.2021		х
Z135	Отчет о целевом использовании полученных средств	...	0.2	...	22.02.2021		х
Z136	Пояснения к балансу	...	0.2	...	22.02.2021		х
Z137	Оборотно-сальдовая ведомость	...	0.2	...	22.02.2021		х
Z138	Агрегирование строк отчетности по разделам аудита	...	0.2	...	22.02.2021		х

Fig. 8. Monitoring of work completion

9. If necessary, the user of the program can upload an existing document, whether it is filled or template, in any of the proposed formats (. docx, .xls, .pdf), at his own discretion.

As a result, at the end of filling out all working documents, the auditor has a complete vision of the company from the inside. On the basis of the obtained data, the auditor can form an audit opinion for the client.

Also, this program has several auxiliary functions. For example, in the event of an error, the data is automatically analyzed and a log on this problem is generated. The program also has an internal guide. During any operation, you can click on the question mark, and the program will show a summary of what the operation is for, and what values you need to enter. As a

result, it can be said that this solution is the program of choice at the moment, however, this software can be qualitatively changed and reworked.

3.5.3 Determining the shortcomings of the solution

In this part, the work presents some features that could be improved in the software. The first feature is using data from the base of accounting. In ready-made solutions, uploading functions by uploading a data file from the accounting database, which is not the fastest way to work. To optimize this block, a way to synchronize programs directly should be created. This will provide a more user-friendly experience and save the work time of auditors.

Calculation data could also use some improvement. Tables for calculations, as well as working documents required to be filled, are taken from different containers. In order to save resources, everything related to working documents should be combined into a single database. Also, the data is not always calculated correctly, perhaps there is a failure of mathematical functions or the downloaded data. This can be solved by diving into the technology layer of the program and fixing the errors.

One of the important parts of working with software is technical support. There is technical support in the existing solution, but at the moment, it requires a phone call and / or an email to the manufacturer's company. If there are problems, the answer to the necessary question can not be received immediately, and if it is a technical problem, then it can completely block the work of the company for an indefinite period. A proposed solution to this problem could be the following: adding the possibility to download data related to a specific problem and adding a feedback module to the program, where it will be possible to upload an error file, which will allow technical support specialists to quickly find the error and eliminate it. Next, the auto saving of documents will be addressed. It seems that this function is too simplistic, but it does not exist in the reviewed software. On the negative side, if the program fails, the user can lose a huge amount of the work performed, and will have to start everything over. With the introduction of this function, it will be possible to set up auto-saving of the project once at a time, or auto-saving after each processed working document. And the last feature reviewed in this part is a database of established customers. There is this base in the program, but it can be improved and optimized. If the client contacts the audit company not for the first time and their legal data has not changed, it will be possible to select the package of documents that must be filled in in accordance with the previous audit of the client, which will save many hours of work with an average flow of clients.

4 APPLICATION AND COMMERCIALIZATION OF IT SOLUTIONS FOR AUDIT AUTOMATION

4.1 Building an AS IS model of the company

First, the process of “building a reference model” will be defined here, namely, a logically completed chain of interrelated and repetitive activities. As a result of these activities the resources of an enterprise are used to process an object (physically or virtually) in order to achieve certain measurable results to satisfy internal or external customers. The chain usually includes operations that are performed according to certain business rules. Business rules are understood as ways of implementing business functions within a business process, as well as characteristics and conditions for performing a business process. The task of every enterprise striving for improving its activities is the construction of such processes that would be effective and include only really necessary actions.

Building a model means a kind of representation (image) of the original, including its most important features and properties. If the model has already been built, then building a reference model is the process of studying, analyzing the functioning of the system, or rather, its model. The basic goal of building a reference model is to describe the real course of a company's processes. In this case, it is necessary to determine the result of the execution of the process, who executes it, actions performed and their order, paperflow during the execution of the process, how reliable the process is (the probability of unsuccessful execution) and how it can be extended / modified in the future. [31]

So, the reference model can be called a standard of interconnected processes of an enterprise. In other words, if the model of the current state is made and an adequate reference model is built, an enterprise just needs to fulfill the approved plan of appropriate measures. The building of an adequate reference model is the best tool for the effective modernization of operations, taking into account its features, capabilities and external conditions.

By using a reference model, an enterprise concentrates and systematizes its own accumulated experience (taking into account the best practices) in an easy-to-understand form, using the model as an accurate guideline for achieving the required level of development. The main goal of building a reference model is to see the real opportunities for the development of the enterprise and to achieve impressive results.

Thus, the construction of a reference model is a key element of the development concept, since sooner and later any enterprise needs qualitatively new tools in order to develop further, which means modernization of an enterprise and its processes. The main advantage of the reference model is that processes are considered simultaneously from several points of view: from the point of view of a more efficient model and from the point of view of its interaction with the IT-system. The development of an adequate reference model will need both building an AS-IS reference model (as it is now) and formation of the TO-BE reference model (as it will be after implementation) and, finally, the approval of the action plan. [33] Building a model of the current state is necessary to identify ineffective areas and identify options for solving problems. For this, all the information is structured, analyzed, evaluated. The resulting AS-IS model allows not only to make an objective assessment of the current state and identify internal limitations, but also to bring information to the responsible team, for an unambiguous understanding of the current situation by employees. Therefore, in this section I will demonstrate the work of an audit organization without using an audit process automation system. I consider it necessary to start with the designation of the organizational structure of the enterprise.

– ***Organizational structure***

The organizational structure of the company is shown in Figure 10.

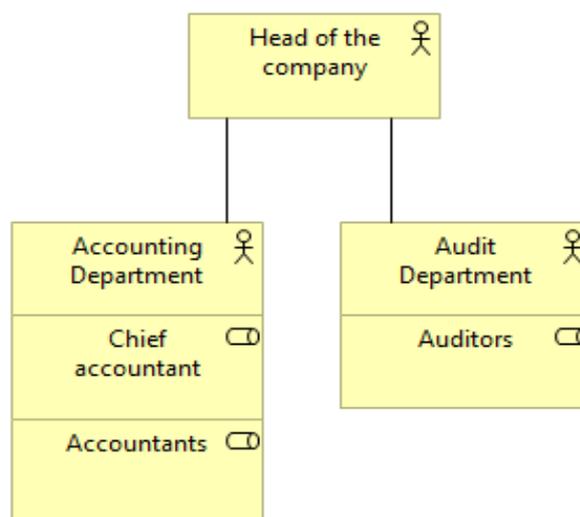


Fig. 10. Organizational structure of the company

There are 2 departments in this company: the audit department and the accounting department. The owner of the company, who in turn is the senior auditor, manages them.

Business Process layer

The description and specification of business-processes are especially important when discussing business automation. A business process is a logical sequence of actions. The purpose of describing a business process is to analyze and regulate these actions. Business processes always involve people. In this case, the main process in the enterprise is the process of performing the audit. In the first stage of the process, the enterprise receives a request from an entity that needs the enterprise to perform an audit. The next and the key stage is the process of performing the audit, which is very complex and was reviewed in previous chapters in more detail. Here, a figure is enclosed showing the audit process. After passing these stages, the third stage is the process of receiving payment from the client (the audited entity).

The result of the chain of these processes is a client that received audit services.

This business process is shown in Figure 11.



Fig. 11. Comprehensive audit process

The audit process is shown in Figure 12.

At the beginning, the audited entity submits a complete set of documents to the auditor, on the basis of which the senior auditor analyzes all the necessary information about the client and his company, and then decides whether to conduct an audit of this person. Next, the audit planning process takes place, in which the auditors selected for this audit, as well as the senior auditor, participate. Then the most extensive part of the work takes place, namely, the audit itself, which is carried out by the auditors themselves, after which, on the basis of the work performed, the senior auditor issues an audit report to the client.

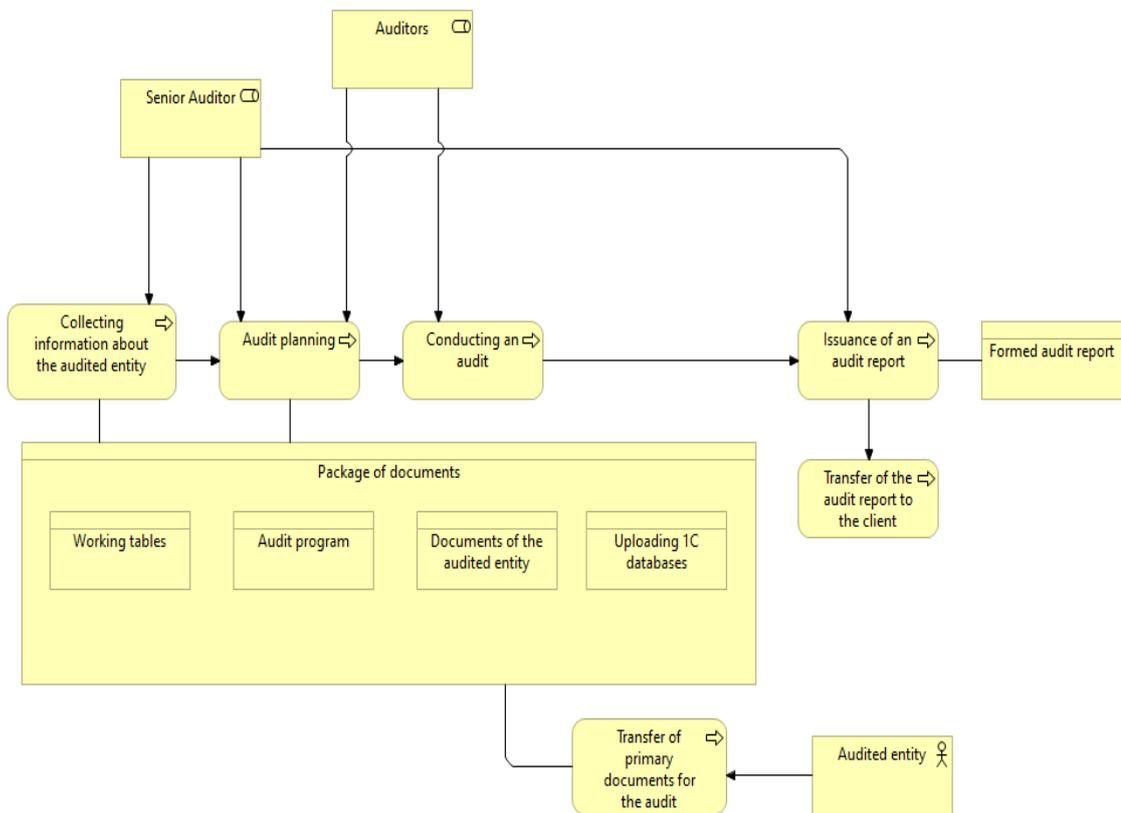


Fig. 12. Audit audit process

– *Application Layer*

For the correct operation of the enterprise, the company has installed information systems from 1C. Accounting is carried out using 1C: Accounting software. The company also has Microsoft Office licenses. Using MS Word and Excel, prepare primary documents and reports. Banking operations are carried out using the payment system via bank accounts. This layer is shown in Figure 13.

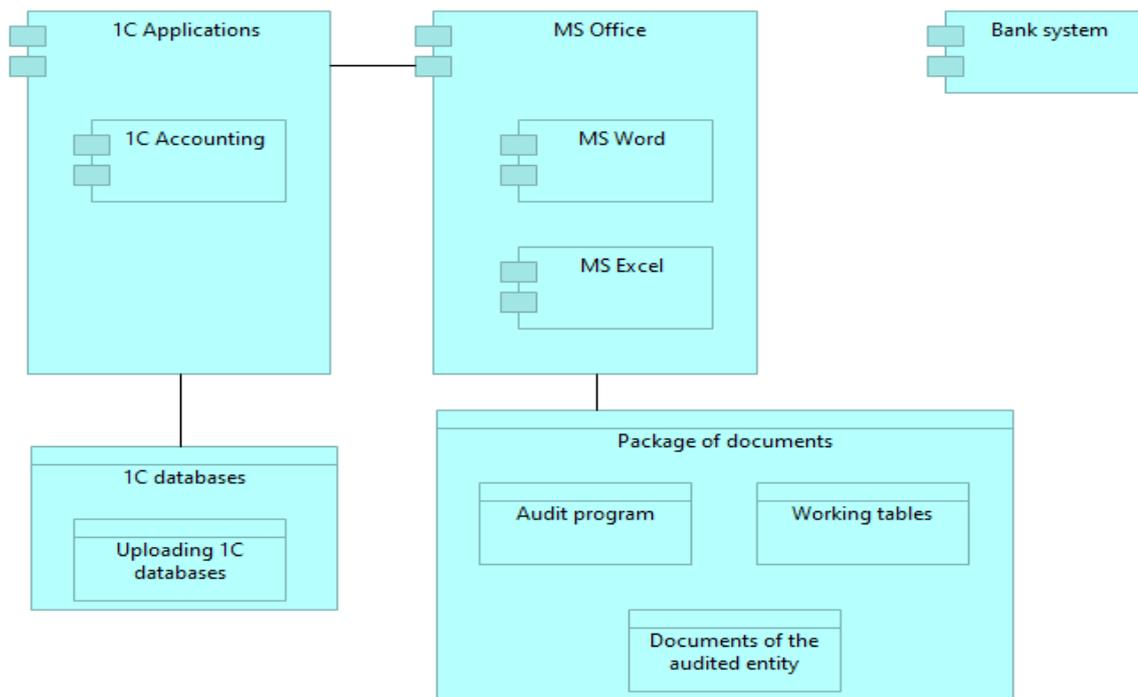


Fig. 13. Application Layer

– *Technological layer*

The technological layer is shown in Figure 14. Personal computers and a bank computer are connected to a single local network of the company. On the PC, there are services for interacting with installed applications, namely 1C: Accounting and MS Office.

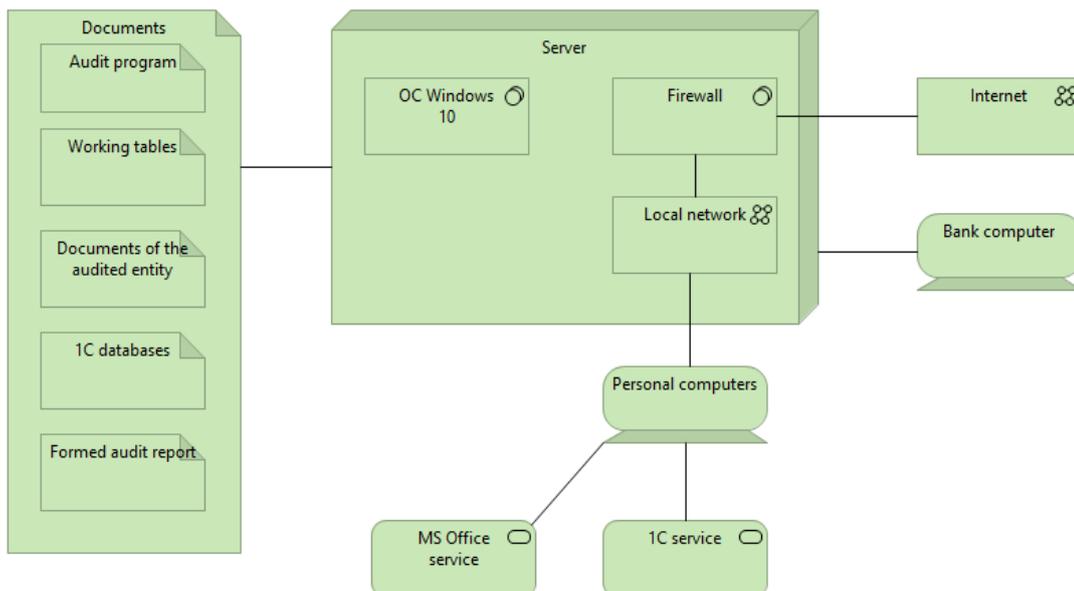


Fig. 14. Technological layer

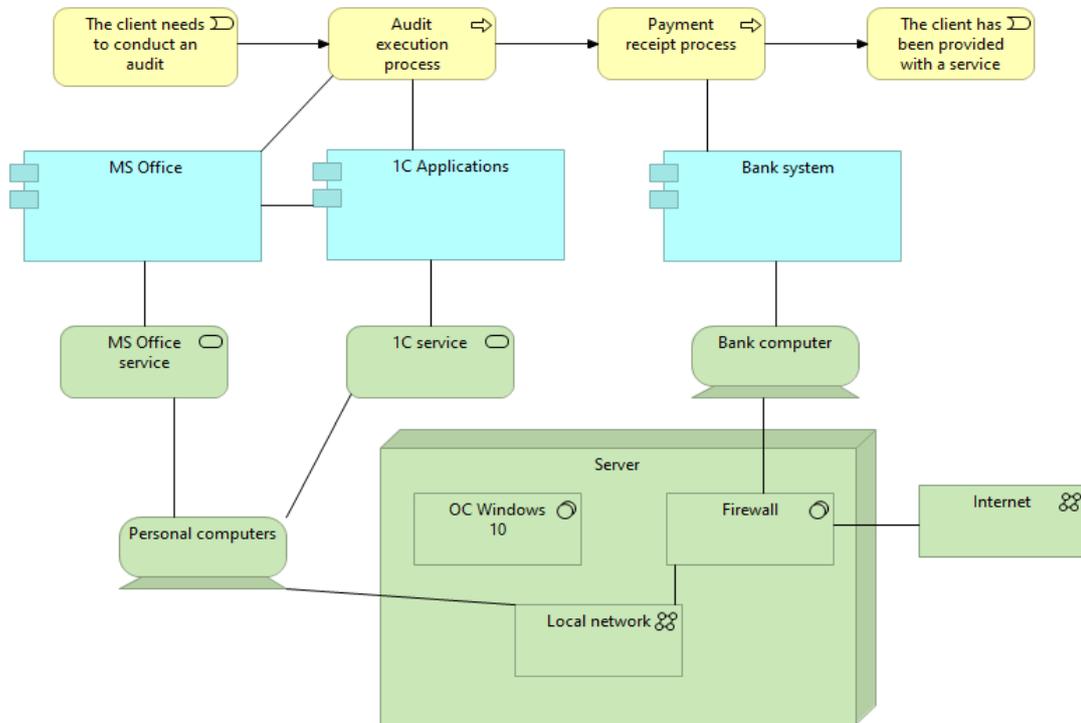


Fig. 15. Layer alignment

– ***Layer alignment***

To be certain that the architecture framework functions correctly, it should be ensured that the individual architectures are consistent with each other. Therefore, all the reviewed layers should be aligned in the right way.

The relationship of all the layers described earlier is shown in Figure 15.

After the layers are reviewed, analysed and aligned, as a result there is a model of the current functioning of the enterprise, or an AS-IS model. This model will be needed in order to correctly build, analyse and compare a reference model TO-BE for the further work and eventual implementation in an enterprise.

4.2 Building a TO BE model of the company

In order to build a TO-BE reference model, it is required to formulate the basic concept of production modernization. In this case, it will be optimization of resources and increasing work efficiency by introducing automated audit solutions and ensuring its smooth integration with the current work of the enterprise to prevent operation failures and any delays in performance.

After determining the available technical, financial and organizational means, as well as taking into account the possibility of integration with the existing (or potential) information system, the vector of the main strategy is determined. Despite the seeming simplicity of the task, this question seems to be extremely important, since it sets the direction for future changes. The enterprise modernization strategy should consider whether the processes are ready to satisfy consumer demand. This means determining the speed of response to received orders and planning the future status of the enterprise.

Taking into account the adopted development strategy, a TO-BE reference model is drawn up. When building a model, it is necessary to understand the real capabilities of the company in order not to try to build a SHOULD-BE model, which will have no chance of implementation. The resulting reference model is an ordered diagram of business processes, that is, an image of the system and its components. The model is based on the functional model of the enterprise. Each branch of the scheme corresponds to a certain section. All processes are depicted and form functional blocks connected by arrows, that is, streams of information that ensure the operation of these blocks.

It is important to ensure transparency of the course of processes because only in this case the owner of the business process (an employee of the company who manages the course of the business process and is responsible for its results and effectiveness), management and other stakeholders will have a clear understanding how the work is organized. Understanding the course of existing business processes enables the owners and stakeholders to judge their performance and quality, which is essential for developing a business-supporting IT-architecture. Successful development of systems that support the execution of business processes from start to finish is possible only when the processes are clear in detail.

The reference model of the architectural solution will be based on the as is model of the organization structure without the use of the audit atomization system.



Fig. 16. Comprehensive audit process

The implementation of the audit automation system does not affect the scheme of the main process, shown on Figure 16. in any way, since significant changes occur within the "Audit execution process" sub process.

– **Business Process layer**

Next, the necessary changes are considered using the decomposition of the "Audit execution process", Figure 17. The graphical diagram is the central element of the reference model, it contains the connections of the blocks, as well as the relations associated with them. Functional blocks represent the main functions of the modeled object. Functions can be decomposed into separate parts and presented in the form of more detailed diagrams.

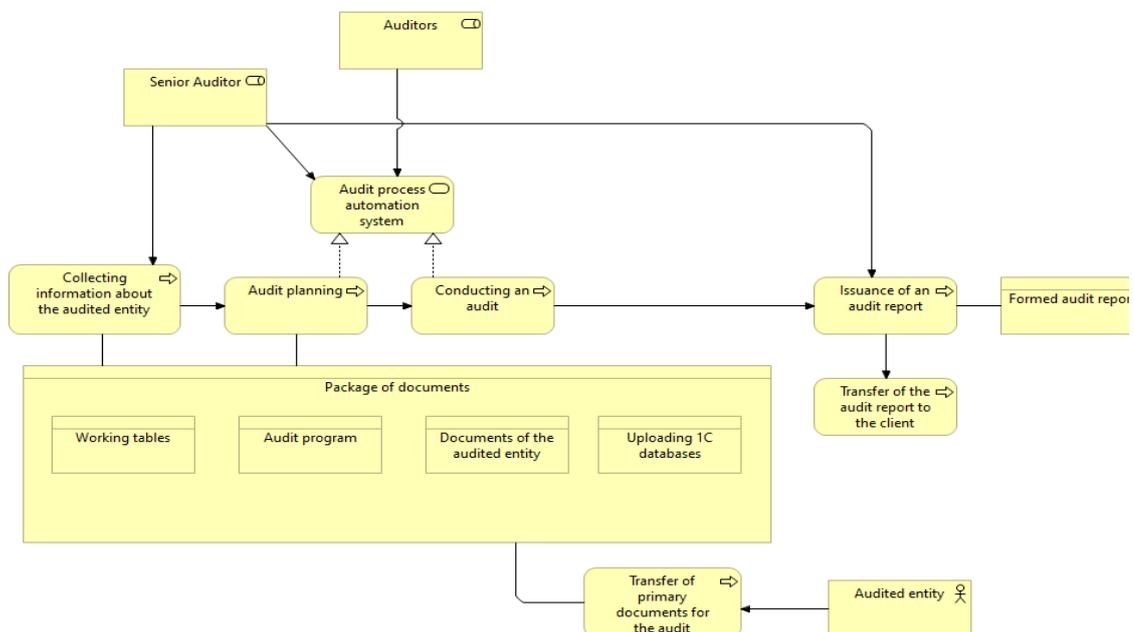


Fig. 17. Audit execution process

Once the TO-BE reference model is ready, it is checked for compliance with the main goals and capabilities of the company. As a result, the implementation of the audit automation

system has significantly reduced the workload of auditors. They do not have to make all the necessary working documents manually, as well as calculate the necessary data for further work. It is worth adding the fact that now the chief auditor will be able to track the progress of work in real time, which in turn will help to avoid violating deadlines. The system contains a database with a package of necessary documents, some of which are filled in from the proposed answers, and some have the function of auto-filling based on previously received data.

– *Application Layer*

In the application layer, the new application will include an audit automation system. The system also integrates with 1C and interacts with MS Office, which is still needed for printing documentation and contacts with contractors. The whole thing just got more streamlined and automated. The application layer is shown in Figure 18.

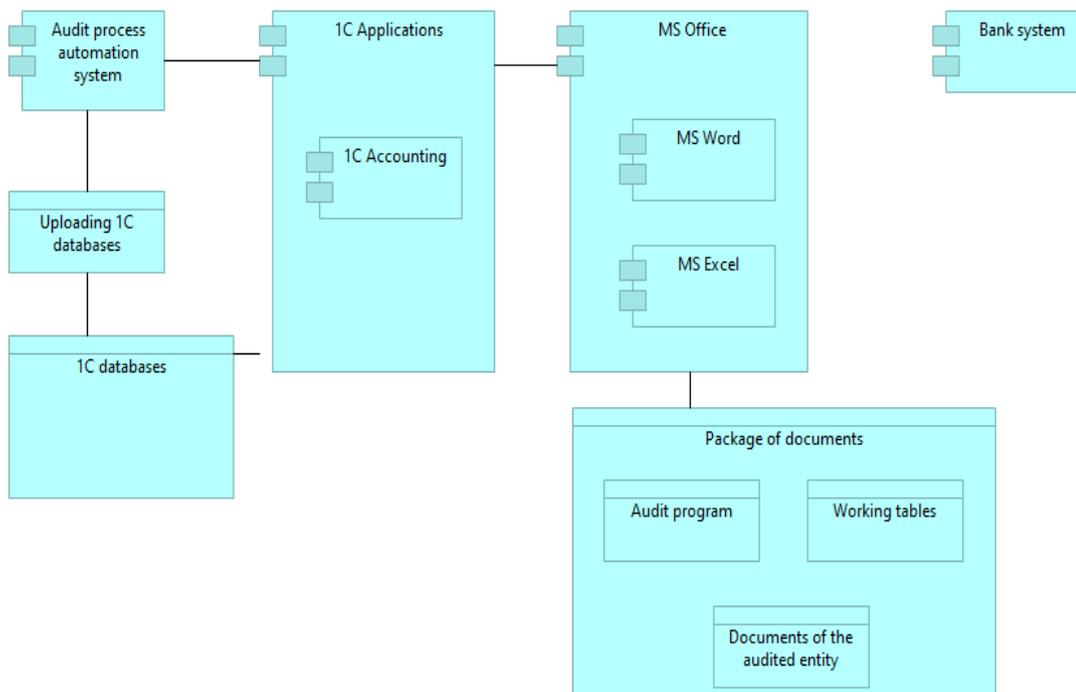


Fig. 18. Application Layer

– *Technological layer*

The implementation of the system will require the installation of an interaction service with the audit automation system it is shown on figure 19.

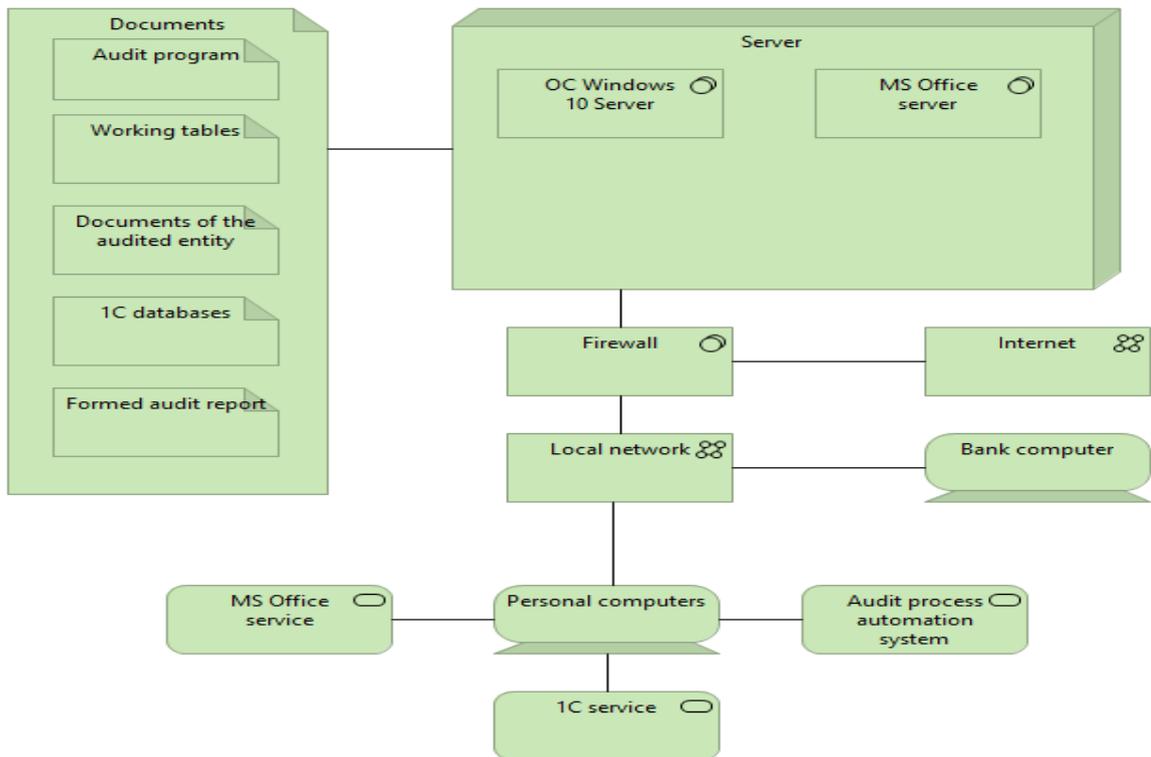


Fig. 19. Technological layer

– *Layer alignment*

The alignment of all the company layers is shown in the figure 20.

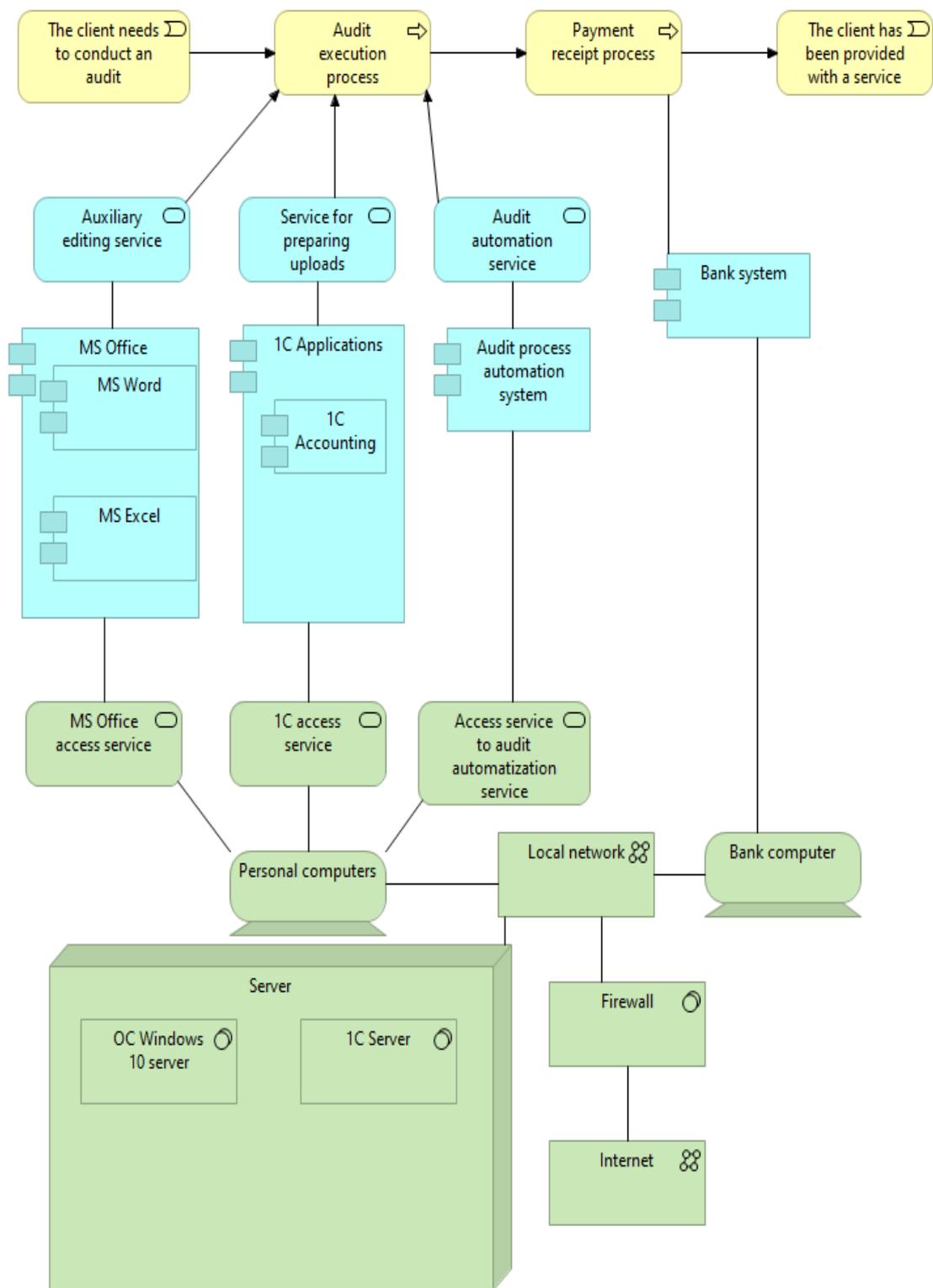


Fig. 20. Layer allignment

4.3 Building a reference model of an IT solution

Requirements for the current systems can be presented as a result of an analysis of the goals the software is designed for, and also the software already operating in the organization. The development of modern software systems rarely starts from scratch. Most often, an enterprise has a working system, or a legacy system; however, it is required to expand the range of functions performed, modernize operations, increase productivity, etc. Modeling a legacy system is based on reengineering - the process of creating new functionality or fixing bugs, by revolutionary change, but using software which is already in operation. At the same time, the functionality implemented in the legacy system determines a part of the requirements for the designed software system (in most cases, quite significant).

Reengineering (modernization) of software includes analysis of functions of an existing application, restructuring of software elements taking into account new business processes, changes in the scale of activities and business structure, new goals of an enterprise, introduction of the necessary modern data formats into the modernized application, ensuring compatibility with modern operating systems, creation of an improved and more user-friendly user interface, forecasting and providing opportunities for changes that may be needed in the future.

It should be ensured that data migration and optimization run smoothly. For that, analysis and optimization of the structure of existing databases should be provided, as well as converting existing arrays of information into a new format with a guarantee of 100% safety of all existing information. The key goal is providing a more stable, convenient and secure work with data for the user.

Development and addition of new functionality should be performed by using analysis of updated business realities, new features of business tasks and processes, and, based on that, development and implementation of the corresponding new functions is performed. Thus, the process of reengineering is a fundamental rethinking and radical redesign of processes in order to achieve the maximum effect of production, economic and financial activities, formalized by the relevant documents. With regard to the development of information systems, software architecture reengineering is a part of a whole business process reengineering.

In this chapter, I will build a software architecture model based on the analysis of the weaknesses of ready-made IT solutions.

The figure 21 shows the reference model of the IS for financial audit automation.

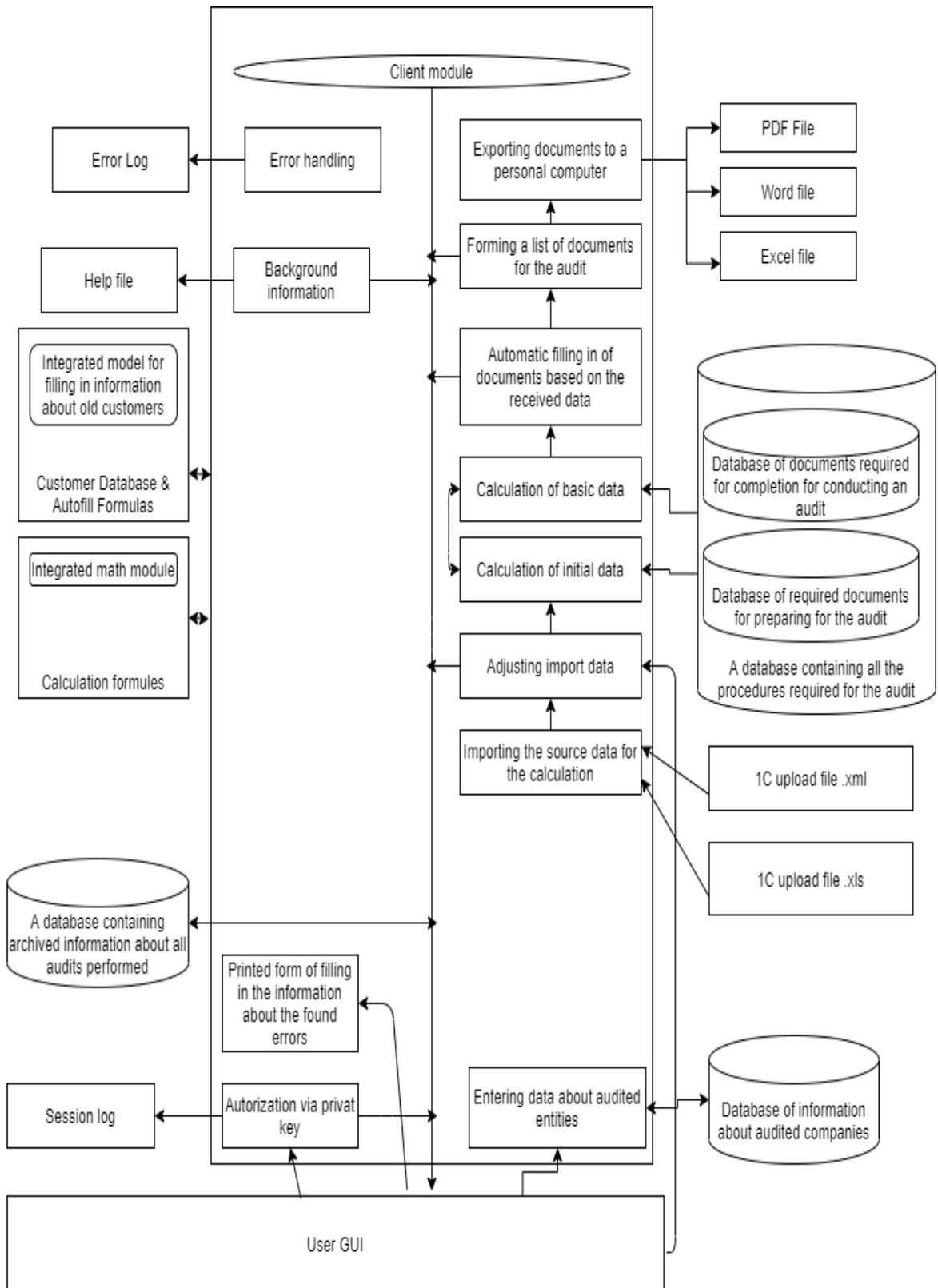


Fig. 21. Software architecture

In this model, several functional blocks were added to improve this solution.

The new functionality includes the following blocks:

a unified database containing all audit procedures – this database contains the entire primary set of documents and templates that are used during the audit procedure.

the form of filling in errors found by the user – a form that allows the administrator to immediately inform the administrator about an error found in the program, which can help reduce the time for its elimination for more comfortable use of the program.

Integrated module for filling in information about old clients – this module allows you to save time on filling in documents for persons who are already clients of the audit company.

4.4 Using ready-made IT solutions in the company

In this chapter, the main focus will be on the implementation of ready-made solutions on a practical level, namely, in the enterprise. It is reasoned that when solving standardized tasks, the use of ready-made IT solutions saves time and budget, as nowadays there are lots of options in the market. The enterprise shall analyse these options in order to choose the one corresponding to the main goals of the company, taking into consideration its everyday task, the qualification of employees, the level of functionality, technical characteristics and the budget the company plans to spend in order to implement such a solution.

The more detailed the requirements are, the more suited IT-solution can be found for an enterprise, with functionality and content corresponding to the needs. Most functions that are needed for the full operation are already in the program. Besides, ready-made solutions are already tested by multiple companies and are therefore quite predictable in their work.

I have completed surveys in order to decide on the method of use of a ready-made IT solution in the enterprise to make sure the chosen option provides the right level of optimization and using it will help to fulfill the goals of the enterprise. For that, I needed to compare the current processes with the changes that took place after the enterprise started using an IT-solution.

Based on my survey of 10 auditors, it was found that, without using auxiliary programs, the average time spent by an auditor for conducting a single audit is 10 working days. Taking into account the fact that the working day in the Russian Federation is 8 hours, the values are the following: on average, among the people I interviewed, the time spent on conducting

an audit is approximately 80 hours of working time. I also received data that the average cost of conducting an audit is 120,000 rubles. All these facts show us that the financial benefit of conducting an audit without taking into account the costs is 1500 rubles per hour.

Now that I know the revenue that audit services bring without using third-party software, it is worth calculating whether the implementation of the software in the company will be commercially effective.

The Audit Expert audit automation program was implemented in the company. The time spent to train users to work with the software was 20 hours. The first audits of auditors using this system took a little longer than the subsequent ones, due to the adaptation to this software, but the following data was obtained as a result of 10 audits. On average, this time, the time spent on conducting an audit for the clients of the company was 5.5 days, which in turn equals 44 hours of working time. At the same time, the average cost of the audit naturally remained unchanged.

After calculating the financial benefit of conducting an audit using third-party software, I got the following values. The revenue brought to the company through the audit increased to 2,720 rubles per hour.

In the end, in addition to increasing revenue per hour, the qualitative and quantitative advantages are evaluated. The qualitative changes included easy and fast access to verification documents and real-time tracking of the work progress, while the quantitative advantage is speeding up the audit process and the ability to increase the flow of customers per year by saving time spent on a single audit.

Based on the results of the work carried out, the enterprise receives, besides the extra revenue and in addition to reducing the complexity of technical processes and increased transparency of management, a new way of thinking for the employees of the company, focused on improvement and constantly ready for a critical review of existing methods of work.

In general, improving the quality of the auditor's work is closely related to the use of software during an audit. Using IT-solutions not only allows the audit organization to solve the main tasks that I listed above, but also, as a result, to get a competitive advantage in comparison with other audit organizations.

Since the audit task, defined in the Federal Law "On Audit Activities" №. 119-FL, means that audit is actually an expression of opinion, the more accurate the opinion is, the more realistically the economic situation of the audited entity is described. A description of the real state of affairs of a particular company can give it a greater opportunity to find its niche

in the country's market.[19] Current ready-made IT-solutions thoroughly provide such opportunities.

Therefore, using IT-solutions gives advantages both for the audit firm and the audited entity.

5 DISCUSSION AND CONCLUSIONS

Based on the work done, it can be concluded that at present IT and IS are almost mandatory for use by many business areas. In this thesis, the possibility of automating audit activities has been studied, the analysis of the domestic market of existing solutions for financial audit automation, detection of their advantages and weaknesses, as well as the practical study of using the latter in the audit company and reviewing the opportunities of implementing audit automation systems have been carried out. In order to do this, the auditing process and regulations, types of audit services and the existing legislations were reviewed. With the consideration of the theory and practice of auditing and the necessary requirements for it, the author has come to the conclusion that at the moment audit automation is a developing niche. Despite the fact that the modern market already provides some programs for audit automation, which are relatively time-tested and used by enterprises, nevertheless, the sphere of audit in Russia is still far from widespread automation. Most businesses have yet to test such systems and introduce them on an ongoing basis.

Speaking of automation, it is important to understand that this is not about replacing human labor with software, but about expanding the capabilities of companies and processes. Software is an assistant to a competent auditor and an audit company, not a replacement. It is clear that, since the result of the audit is an expert opinion and the assessment of the state of an audited entity, taking into account all the nuances identified during the audit, the expert himself, a highly qualified auditor, continues to play a key role with or without automation. However, audit automation programs take on the routine functions that are present in the work of the auditor in large quantities, which are time- and labor-consuming.

First, audit automation software allows you to put repetitive actions on the stream, thereby not only saving time for auditors and the company, but also reducing a serious risk - the risk of human error during routine procedures. A person, in fact, is left to do only intellectual work: a thorough analysis of the current situation, for which he uses, among other things, this software, and making an assessment of the state of the business of the audited company, that is, an auditor's opinion.

Secondly, the point at issue is increasing the competitiveness of audit companies using complex audit automation solutions. Saving time, budget and human resources gives such a company a serious advantage over similar companies in a competitive market.

Despite these benefits, not all companies have adopted the strategy of process automation. After all, this refers the restructuring of business processes, which not all enterprises can

immediately decide on. It is necessary, among other things, to train employees in a new way of working, which does not always go smoothly. However, such skills - the ability to work efficiently with modern software - gives an advantage not only to the audit company in general, but also to the auditor as a valuable expert in the market in particular.

Moreover, at the moment, specialists have the opportunity to choose the most optimal software for their tasks, which has a certain set of functions. An overview of some applications and their comparative characteristics have been provided in this work.

To investigate how automation affects audit, I analyzed the current market for audit automation software in the Russian Federation. Based on this analysis, it became clear that there are only a few ready-made solutions on the market, and only a couple of high-quality ones. This suggests that this area is commercially effective for doing business in it, due to the lack of competition. Based on a survey of users, the "strongest" IT solution at the moment was identified, it was AuditXP. I built a model of this system based on theoretical data. It is good, but there are many things that can be added to it.

After analyzing the market, I conducted a study that showed how profitable it really is to use an audit automation system. I built the AS-IS and TO-BE models. The AS-IS model demonstrated how an audit organization functions without using the system. The TO-BE model was built to demonstrate the effectiveness of using the software. Based on these models and calculations, I received the following benefits from using the audit automation system in the company: the time required for an auditor to conduct an audit on average was reduced by 40%, which in turn increases efficiency and opens up new development paths for the company. Also in this paper, I researched the financial efficiency of the development of the actual software for audit automation. I made calculations that showed that if the project is successfully implemented, it will pay off in 11 months.

Basically, in the course of practical research carried out at the enterprise during the research, it was possible to find out exactly how the implementation of complex solutions for audit automation helped to increase the efficiency of enterprises and contribute to the best performance of business tasks. Out-of-the-box solutions were tested, and customized solutions were analyzed. In any case, the result turned out to be positive, since in the course of audit automation eventually all business processes are transformed for the better, meeting the challenges of the time. In addition, while developing a competent strategy and considering complex solutions for automating audit as a long-term strategy, the company

did not have serious problems in training employees and applying new business processes in a real-case scenario.

The author highlights that the sphere of using systems for automating audit activities has a positive impact on the enterprise and contributes to its development. The companies - especially auditing enterprises and IT-developers - that are planning to have a strong presence at the modern developing and competitive market will face the need to take into consideration the opportunities of using both existing software solutions for audit and designing new, better solutions that will allow to take the auditing work at a new level and to facilitate respective market evolution in Russia in general.

6 SUMMARY

The current thesis is devoted to studying and implementing IT-solutions in the sphere of audit automation in Russia. Namely, it explores review and evaluation of software and the qualitative changes they make when applied to audit processes in companies, comparing such solutions and defining their advantages and disadvantages, as well as the practical use and its outcome. The applied nature of this work provides an experimental study of audit work optimization by using software and possible further development of audit IT-solutions.

The work consists of three main chapters, an introduction, a conclusion and a list of references. The first chapter focuses on theoretical aspects of an audit, its procedure, services, definitions and legal regulations. The chapter is needed in order to give an overview of the audit process and its challenges and serves as the basis for the further, more practical, research.

In the second chapter of the thesis, the author addresses existing IT-solutions for an audit that exist on the Russian market, focusing on the most popular ones, evaluating and comparing them in order to choose the one that will be the main subject of the further study. Then this software is explored in detail to see the principles of work that will be needed for the next step, which is application.

The third chapter is dedicated to application and commercialization of the reviewed solution. It is of practical nature and focused on building reference models for the implementation of the software and improving the competitiveness of companies using such programs and also studies the practical case of a company that already implemented this program.

The results of this work can be further extrapolated and used in audit companies that are planning to introduce IT-solutions, and also be considered and a reference for the companies that develop such solutions.

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