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FOREIGN EXPERIENCE OF AUDIT COMPUTERIZATION: SPECIFICITY AND PROSPECTS FOR UKRAINIAN PRACTICE

ЗАРУБІЖНИЙ ДОСВІД КОМП'ЮТЕРИЗАЦІЇ АУДИТУ: СПЕЦИФІКА ТА ПЕРСПЕКТИВИ ДЛЯ УКРАЇНСЬКОЇ ПРАКТИКИ

Summary. *Introduction. The article examines audit computerization as a factor that significantly improves the quality and accuracy of audits, especially in the conditions of growing complexity of financial transactions and high requirements for business transparency.*

The purpose of the article is to conduct a study of the successful practice of foreign experience in the computerization of audit, to identify the possibility of its adaptation within the national framework.

Methods and materials. The author analyzed scientific publications on computerization of audit; reports of audit entities; applied methods of comparative analysis, systematization and generalization of foreign experience.

Results. It found that in developed countries, audit automation has already become the standard, allowing for significant optimization of processes thanks to computerized solutions such as automated data processing systems, cloud computing, algorithms for big data analysis, as well as artificial intelligence. The study of the best global practices will make it possible to identify the most successful options for improving audits in Ukraine through the implementation of foreign experience to significantly increase the effectiveness of audits and improve the quality and speed of their implementation. In addition, it will also contribute to building transparent and reliable relations between business, the state and investors. Computerization has been proven to allow auditors to better manage large amounts of data and reduce the risk of human error. As a result, the accuracy of the results and the overall efficiency of the audit increases. The experience of international audit practice shows that automation allows reducing time spent on standard procedures and concentrating efforts on strategic analysis and decision-making. This ensures a higher level of control and transparency in financial matters.

From our research, it was concluded that the problem of computerization of audit requires focusing on ensuring a balance between advantages (increased accuracy, efficiency, efficiency) and disadvantages (security risks, requirements for technical training, adaptation of the regulatory environment, etc.). For audit firms, this issue is important. In addition, depending on the volume of services provided by the audit subjects, as well as their size, the results of the balance sheet will be different.

Discussion. Thus, the experience of audit computerization in foreign countries is a valuable for Ukraine, where the introduction of digital technologies can significantly improve the quality of audits and create a reliable system for ensuring financial transparency.

Key words: *audit, audit activity, computerization, foreign experience, financial reporting, digitalization.*

Анотація. *Вступ. У статті проведено дослідження комп'ютеризації аудиту як чинника, що суттєво покращує якість та точність аудиторських перевірок, особливо в умовах зростаючої складності фінансових операцій і високих вимог до прозорості бізнесу.*

Мета статті полягає у проведенні дослідження успішної практики зарубіжного досвіду комп'ютеризації аудиту, виявлення можливості її адаптації у межах національних рамок.

Методи і матеріали. Проведено аналіз наукових публікацій присвячених комп'ютеризації аудиту; звітів суб'єктів аудиторської діяльності; застосовано методи порівняльного аналізу, систематизації та узагальнення зарубіжного досвіду.

Результати. Виявлено, що у розвинутих країнах автоматизація аудиту вже стала стандартом, дозволяючи значно оптимізувати процеси завдяки комп'ютеризованим рішенням, таким як автоматизовані системи обробки даних, хмарні обчислення, алгоритми для аналізу великих даних, а також штучний інтелект. Вивчення кращих світових практик уможливить адаптацію аудиту в Україні, що значно підвищить ефективність аудиторських перевірок та покращить якість і швидкість їх проведення, а також сприятиме побудові прозорих і надійних відносин між бізнесом, державою та інвесторами. Адже, комп'ютеризація дозволяє аудиторам краще управляти великими обсягами даних та знижувати ризик людських помилок, що, у свою чергу, підвищує точність результатів і загальну ефективність. Досвід міжнародної аудиторської практики показує, що автоматизація дозволяє зменшити затрати часу на стандартні процедури, сконцентрувавши зусилля на стратегічному аналізі та прийнятті рішень, що забезпечує більш високий рівень контролю та прозорості у фінансових питаннях.

Загалом з проведеного нами дослідження слід резюмувати, що проблема комп'ютеризації аудиту вимагає зосередження на забезпеченні балансу між перевагами (підвищення точності, ефективності, оперативності) і викликами (ризиками безпеки, вимогами до технічної підготовки, адаптацією регуляторного середовища тощо). Для аудиторських фірм це питання має надважливе значення, однак залежно від обсягів послуг, які вони надають, або залежно від величини суб'єкта аудиту, результати такого балансу будуть різними.

Перспективи. Таким чином, досвід комп'ютеризації аудиту в зарубіжних країнах є цінним орієнтиром для України, де впровадження цифрових технологій може значно покращити якість аудиторських перевірок і створити надійну систему для забезпечення фінансової прозорості.

Ключові слова: *аудит, аудиторська діяльність, комп'ютеризація, зарубіжний досвід, фінансова звітність, цифровізація.*

Statement of the problem. Auditing in modern conditions is actively developing and performs its function in accordance with current legislation. For Ukraine, this kind of activity serves as an important lever for ensuring transparency, truthfulness and trust in the reporting of economic entities. The growth of information technologies in business and the spread of digital management tools actualize the issue of their use in other areas as well. Accordingly, since digitalization in the age of active technical progress becomes an integral component of the development of any systems, it affects audit. In unstable, turbulent conditions, due to the increase in threats and challenges, there is an objective need to increase the efficiency, accuracy and effectiveness of the audit, which can be provided by computerization. In developed foreign countries, digital technologies are widely used in audit processes. The rapid implementation of modern information technologies in the activity of auditors significantly increases its quality and efficiency. Despite the presence of many advantages from technical innovations, their implementation is somewhat slow, especially for the Ukrainian practice of audit activity. It is the limitation of the practical implementation of innovative technologies that is one of the unresolved problems that requires a more detailed study and solution. The need to study the experience of other countries to implement best practices and improve audit efficiency in Ukraine is associated with many potential benefits. Therefore, this direction of scientific research is extremely relevant.

Research and publications analysis. Innovations in auditing, the development of its tools, organization and practice have been in the field of view of scientists for a long time. In this context, attention should be paid to the research of such scientists as Dmytrenko E.S., Lubenchenko O.E., Pushkar M.S., Radionova N.J., Tsimoch K.V. and many others [1–5].

At the same time, almost all studies, without exception, in one form or another, contain the main thesis that modern audit actively uses new approaches and tools. In addition, new tools and conditions, as Pushkar M. rightly observes. S., encourage the development of a new theory, since the existing one no longer fully covers the actual specificity and essence of modern audit [4, p. 105–108].

On the other hand, all efforts aimed at the development of audit are subordinated to one goal — to increase its quality. Lubenchenko O.E. notes: "audit, … it is a new, complex process that requires the involvement of all professional and intellectual resources of the audit firm" [2, p. 84–87]. To solve the problem of elementary components of this process, the scientist substantiates in his research the quality risks, the approach to their assessment, and makes descriptions of the relevant developed working documents and ways of providing information to interested users.

The issue of computerization of audit, or, in other words, its development in a digital format, is no less represented in scientific publications. Radionova N.Y., Tsimoh K. IN. they claim that the use of computer information systems and innovative technologies when conducting audit procedures, identify the essence and concepts of computer audit. These scientists analyze computer audit advantages and disadvantages, carry out the classification of IT on these issues, and evaluate them from the point of view of the possibilities of carrying out specialized control operations [5, p. 315–318].

It should be admitted that many foreign authors pay attention to the problems of using computer programs. In this context, they rightly argue that intellectualization is the main modern feature of audit, which

affects its methods, approaches, theory and general practice [7; 8; 9]. The experience of foreign countries related to the use of computerization and intellectualization of audit is valuable for Ukrainian practice, given the more active development.

The purpose of the article is to conduct a study of the successful practice of foreign experience in the computerization of audit, to identify the possibility of its adaptation within the national framework.

Key material presentation. The active implementation of audit activities and the expansion of audit tasks not only in accordance with the current Ukrainian legislation, but also in connection with the challenges inherent in modern times, sets new requirements for such systems. Along with the development of audit tasks and its technologies [3, p. 274–277], there is a need to process a much larger amount of information, which requires the use of more innovative approaches. Modern foreign researchers focus on this. Chinese scientists Qing Lin and Yanzhong Yu. claim that in modern conditions, the intellectualization of audit work takes big data and artificial intelligence as the basis and core of audit. At the same time, a corresponding form of the audit template appears, which allows to improve the technology of data collection, sorting and analysis and the technology of audit judgment. At the same time, the latter involves the work of a specialist with strong versatility and high maturity to create software with an audit template as a core [7, p. 2].

An absolute advantage of the use of computer technologies in auditing is the increase in efficiency, as well as the increase in the detection of hidden problems and risks thanks to the processing of large data sets. It should be noted that in many countries, in China, there are established and normatively regulated requirements for the informatization of audits and the use of information technologies. In accordance with these requirements, the above-mentioned country developed an intellectual audit structure and created its platform based on intellectual analysis [7, p. 2–3]. The main reason for the development of computerization (in some sources of digitization) of audit is the increase in the amount of information and the need to reduce the time of its processing (Fig. 1).

Such a system makes demands on auditors and requires them to have interdisciplinary thinking and comprehensive use of intellectual analysis technology. At the same time, such specialists should be fluent in the theory of diagnosis of deviations (violations), based on expert knowledge, and the theory of financial audit.

As for Ukraine, the adoption of China's experience in matters of informatization of audit obligates the development and approval of the Regulation on the intelligent system of financial audit. Regulation should provide for alternative approaches to processing different types of data, have means and opportunities for automatic search for clues when conducting an audit, as well as methods and tools for data analysis, such as big data analysis, statistical and other types of analysis, etc.

If we implement such a concept, our system of education and training of audit specialists should include the study of relevant disciplines, in particular,

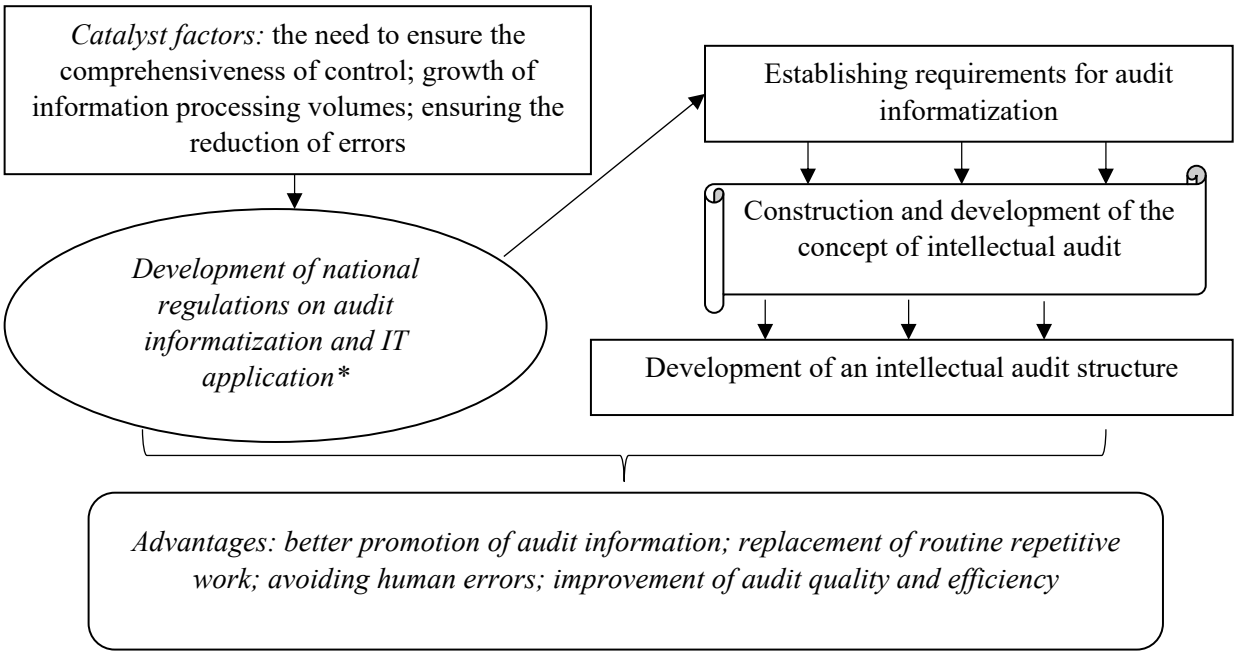

Fig. 1. Basics and consequences of audit informatization in China

Notes: * — the system is based on digital intelligence technology; this document explains how to apply an innovative deep learning method to the audit process to solve key problems such as data collection and sorting, extracting features from heterogeneous data from multiple sources, identifying and analyzing anomalies (violations or deficiencies) inherent in the activities of the audited entity.

aimed at ensuring the understanding of new technologies (such as artificial intelligence, blockchain, cloud technologies, etc.), security awareness, visualization, mastery of analytical tools (Big Data, etc.) etc. In the conditions of martial law and the instability associated with military actions, financial and other types of risks significantly increase and become more diversified. Because of this, auditors should be able to evaluate and recognize them, form recommendations on alternatives for the further development of the business entity's activities for risk-oriented scenarios. Accordingly, digital audit technologies should implement such tasks as fully as possible on a practical level. Despite this, currently the Ukrainian educational system does not sufficiently provide the necessary skills, since there are few courses devoted to intellectualization and intellectual audit in the curricula. No less important problem of intellectualization of audit is the cost of software products. Not all audit subjects, as well as educational institutions, can afford to purchase them for use and acquiring skills in the practical realm of conducting audit procedures and assessments. Investments in the acquisition of a digital intellectual educational platform, taking into account the specifics of obtaining permits for conducting audit activities (auditors are not trained by Ukrainian universities, as they are subject to specific requirements), are not very justified from the point of view of educational institutions. Audit institutions themselves (firms, etc.) can implement this practice only if they have large volumes of activity and income.

The experience of computerization in Sweden is no less substantive and useful for research and assessment of the possibilities of use in Ukrainian audit practice. This country is among the ten most developed countries according to the human development index. As for the computerization of the audit and the use during its implementation of modern technologies (for example, blockchain, Big Data or others) to increase the transparency and reliability of financial reporting, it ensures the achievement of the expectations of interested parties, as well as the facilitation of audit procedures with the help of new digital innovations.

Melin C. and Toezay G. rightly note that the main advantages of digitizing the audit process include its automation and quality improvement, as well as changing the requirements for specialists. According to the researchers, digitalization has created a gap between the profession and education, and therefore they offer their own model for studying this phenomenon (Fig. 2).

Taking into account the development of the theoretical and organizational foundations of audit computerization, the identification of influencing factors and their consequences, the aforementioned researchers summarize the audit process, identifying its main stages as: preparation (1); planning (2); research (search for evidence) (3); reporting (4) (Fig. 3).

The scheme presented by the researchers does not reflect the features of the approach based on the application of innovative technologies and computerization. However, in further descriptions, the authors evaluate in detail the specifics of conducting an audit in the context of using Big Data analysis, which they consider as a system that has a significant impact on the quality of the audit, and blockchain technology.

In general, from the conducted research, it can be concluded that in Sweden, the vectoral direction of efforts to improve audit quality through the abovementioned technologies provides several advantages, the main of which are:

– increasing the number of verified transactions;
– increasing the quality of the audit, thanks to the use of a large amount of data and ensuring a better understanding of the control processes;
– improving auditors' ability to detect violations and fraud;
– provision of services that go beyond the internal limits of data use and are based on taking into account external factors [6, p. 27].

At the same time, Big Data analysis includes risk assessment; analytical procedures; procedures for consideration of the case on the merits; test control. As for blockchain technologies, they detail the audit and make it possible to identify flaws not from a sample, but from the entire set of accounting data. This

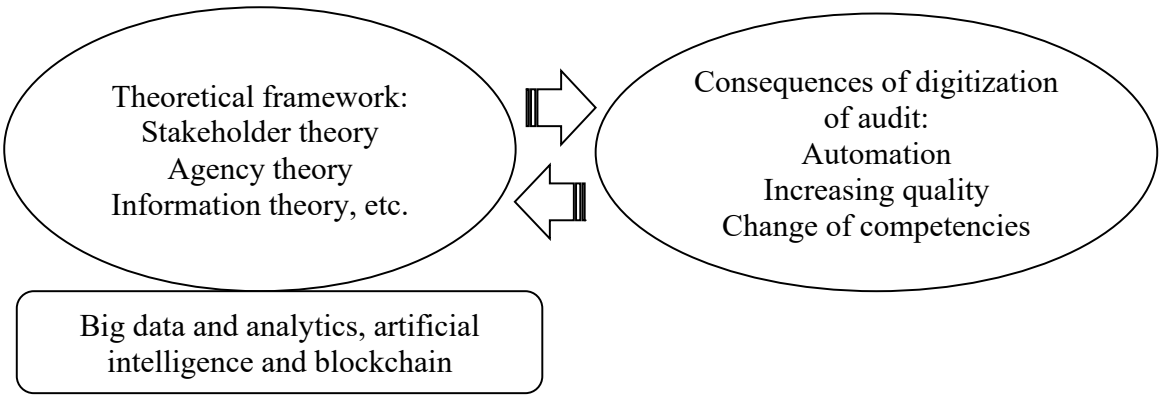

Fig. 2. Research model [6, p. 20]

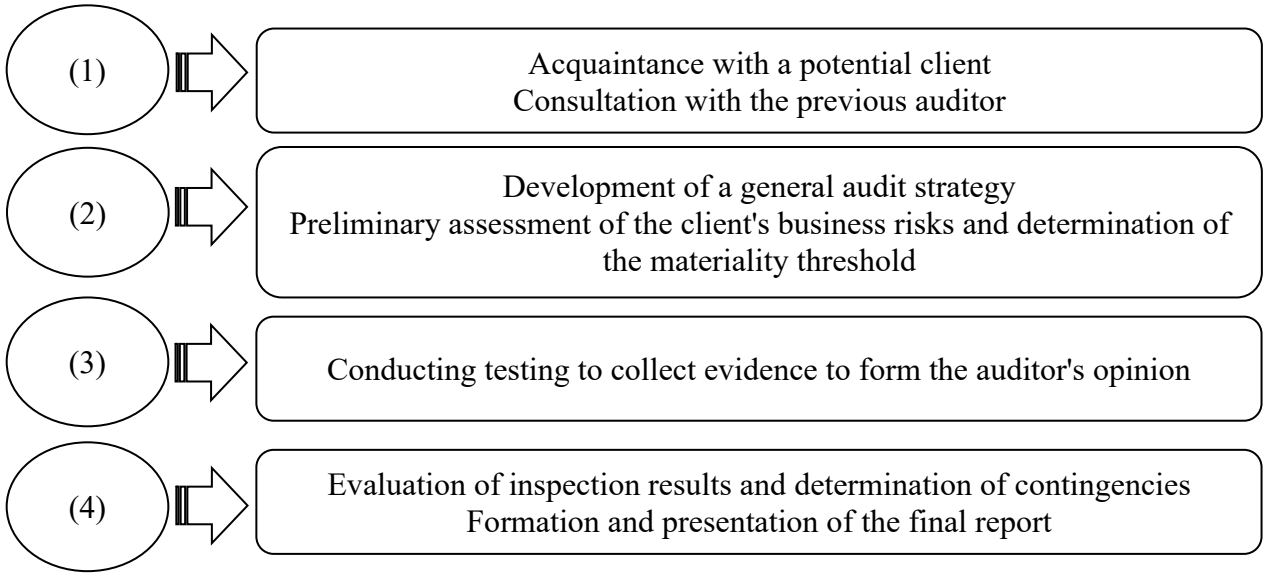

Fig. 3. General scheme of the audit process [6, p. 25]

technology makes the most of reliable data and allows for continuous audits.

Among other important positive aspects that can be used to improve the audit in our country thanks to the experience of conducting it in Sweden, the following should be mentioned:

– integration with the management system (there is constant contact of auditors with the management of controlled entities to implement the task of providing assistance in optimizing activities, identifying risks and implementing effective management methods);
– transparency and openness (the Swedish audit system provide for the publication of reports, which ensures better trust in institutions under control, and can be useful for borrowing by other countries, for Ukraine);
– an integrated approach (implies a complex combination of financial, environmental and operational audits, as a result of which it is possible to fully assess the activity and its impact on society and the environment);
– focusing on preventive measures (implemented through the mechanism of consulting and training the personnel of controlled entities to help avoid risks).

In general, Sweden has a sufficiently developed audit system, the experience of which is useful for Ukraine and the borrowing of whose practices can help increase the effectiveness of control actions. In conditions of increasing risks and instability, the listed elements and characteristics ensure high accuracy and effectiveness of the audit and make this system an important tool and source for the development of effective management models and development strategies of controlled entities. Because of this, the use of Swedish experience will be useful for Ukraine as well.

From our research, it should be summarized that the problem of audit computerization requires focusing on ensuring a balance between advantages (increased accuracy, efficiency, efficiency) and challenges (security risks, requirements for technical training, adaptation of the regulatory environment, etc.). For audit firms, this issue is of paramount importance, however, depending on the scope of services they provide, or depending on the size of the audit entity, the results of such a balance will be different.

Conclusions and proposals. Therefore, deeper scientific research is needed in the future. Currently, our results support the conclusion that the foreign experience of audit computerization shows that the automation of audit processes can significantly increase the efficiency, transparency and accuracy of inspections, as well as reduce the risks of making mistakes and fraud. It is important for Ukraine to introduce modern audit technologies, focusing on automation of routine checks, ensuring data transparency and cyber security, training auditors with appropriate skills and knowledge in the field of IT, integration of the computerized audit system with management systems. As for the application of blockchain technologies and big data analysis, they can provide not only an increase in audit quality, but also to strengthen trust in the audit system in general. Thus, thanks to the study and critical analysis of foreign audit experience, in the part of its computerization, it is possible to use the best achievements in Ukrainian audit practice.

In the future, to solve the problems it is advisable to develop several areas of their study. In particular, research on the effectiveness of the implementation of computer audit systems, the impact of digitalization on the fight against corruption, the integration of big data and artificial intelligence into audit practice (for

predicting risks and detecting fraud schemes), and the development of analysis algorithms (including large financial data in real time). Equally important prospective directions of research are also searches in the field of: ensuring cyber security in audit systems, especially considering the threats that may arise in conditions of digitalization; adaptation of audit standards to the digital environment; development of a risk-oriented approach in auditing; development of principles and approaches to environmental and social audit, etc.

Thus, directions for further research arising from the foreign experience of audit computerization cover a wide range of issues, including technical, regulatory and social issues. For Ukraine, research in the field of cyber security, integration of digital audit standards, as well as the development of automated solutions for control actions in auditing activities are particularly important. This will make it possible to create a more efficient, transparent and risk-resistant audit system that will meet modern global conditions and challenges.

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