

Scientific Bulletin of Mukachevo State University

Series

Economics

Volume 12, No. 2, 23-33

Journal homepage: <https://economics-msu.com.ua/en>

UDC 657.6

Doi: 10.52566/msu-econ2.2025.23

Organisation and areas of development of international audit in the digital economy

Fazil Hajiye

Senior Lecturer

Azerbaijan State University of Economics
AZ1001, 6 Istiqlaliyyat Str., Baku, Azerbaijan
<https://orcid.org/0000-0003-4675-3393>

Nusret Babayev

Doctor of Sciences, Professor

Azerbaijan State University of Economics
AZ1001, 6 Istiqlaliyyat Str., Baku, Azerbaijan
<https://orcid.org/0000-0001-8827-3617>

Fuad Gasimov

PhD, Lecturer

Azerbaijan State University of Economics
AZ1001, 6 Istiqlaliyyat Str., Baku, Azerbaijan
<https://orcid.org/0009-0005-7661-6850>

Abstract. The purpose of this study was to analyse the impact of digital technologies on international auditing practice. An integrated approach was employed, incorporating a comprehensive literature review, case study analysis of major audit firms, and an examination of international regulatory standards to evaluate this impact. This study addressed the urgent need for international auditing to adapt to digital transformation, enhancing financial transparency, cost efficiency, fraud prevention, and global market stability through the integration of blockchain, artificial intelligence, and big data analytics. It was identified challenges related to the need to adapt to new technologies such as blockchain and big data analysis, the impact of global economic trends on financial statements, and different approaches to unifying audit standards and ethics internationally. The study identified how these technologies contribute to reducing audit costs, increasing operational efficiency, and improving financial transparency, which in turn strengthens investor confidence and enhances the stability of financial markets. It was noted that the integration of blockchain ensures fraud

Received: 20.02.2025, Revised: 23.05.2025, Accepted: 30.06.2025

Suggested Citation: Hajiye, F., Babayev, N., & Gasimov, F. (2025). Organisation and areas of development of international audit in the digital economy. *Scientific Bulletin of Mukachevo State University. Series "Economics"*, 12(2), 23-33. doi: 10.52566/msu-econ2.2025.23.



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*Corresponding author

prevention and the reliability of financial data, reducing economic risks associated with financial misstatements and corporate fraud. Big data analysis was proven to improve risk assessment and predictive financial analytics, allowing businesses to make more informed investment and strategic decisions. The results can serve as a basis for developing strategies and tactics for introducing digital innovations into the practice of international auditing, providing audit companies, regulators, and organisations with tools and recommendations

Keywords: technological progress; cybersecurity; blockchain technologies; big data analysis; standards; international audit

Introduction

In an era when digital technologies are becoming an integral part of the business environment and global economic ties are increasingly intensifying, international auditing is becoming important to ensure transparency and trust in the financial reporting of companies around the world. The introduction of digital innovations and the increase in business scale provide audit practices with new challenges that require careful analysis and adaptation. Notably, not only the methods of conducting an audit, but also its objectives are undergoing changes under the influence of modern trends. The development of technology and globalisation necessitate the revision of international audit strategies in order to consider new challenges and opportunities. In this context, the study of the organisation and prospects for the development of international auditing becomes not only relevant, but also a strategically important step for adapting auditors to a rapidly changing reality. It is important to emphasise that these changes relate not only to aspects of the technical implementation of auditing, such as cybersecurity and the use of the latest technologies (for example, blockchain and big data analysis), but also to the very essence of auditing standards and approaches. The rapid development of the digital economy requires auditors not only necessary skills, but also flexibility in adapting to new conditions and challenges facing global business.

N. Musayeva *et al.* (2022) analysed in detail the main trends and challenges associated with the processes of digital transformation in international auditing. The researchers investigated how rapidly developing technologies affect established standards and conventional audit methods. The results highlight key aspects such as changes in standards, changes in audit methods, and the need for close attention and possible revision of current approaches to the organisation of audit processes. M.A. Alnaimat *et al.* (2023) argued that success in international auditing is closely linked to the successful implementation of modern technologies. The researchers substantiated the importance of using innovative tools such as blockchain and big data analysis, and emphasise their ability to improve the efficiency and reliability of audit processes. Authors provided specific examples of the successful application of these technologies in auditing practice. R.H. Shikhaliyev (2023) researched the impact of cybersecurity on auditing activities. This analysis focused on the dangers associated with storing and transferring financial information in the digital economy, suggesting specific strategies and methods to ensure data security. The study highlighted key aspects of cybersecurity that require

the attention of auditors to ensure the reliability and confidentiality of customer data. S. Agamamed *et al.* (2023) drew attention to global economic trends and their impact on international auditing standards. The analysis conducted by the researchers covers how changes in the global economy can affect the business processes of organisations, requiring an appropriate revision of audit methods to adapt to new realities. R. Allahyarov (2023) focused on strategies for adapting auditors to the challenges of the digital economy. The researcher considered which competencies and skills are becoming critical in the new digital landscape, and also offers recommendations for training and staff development in audit companies.

Researchers D. Barr-Pulliam *et al.* (2022) analysed the impact of individual, task and external factors on digital transformation and innovation in audit practice. The authors focused on studying how different factors affect the introduction of digital technologies in the audit and innovation processes in this sector. The authors found that the adoption of digital technologies in audit practice depends on three main groups of factors: individual characteristics of auditors, specifics of the tasks performed, and the external environment, including technological infrastructure and economic conditions. The purpose of the study by A. Eltweri *et al.* (2022) was to study the process of adopting International Standards on Auditing (ISA) from an institutional perspective. The authors analysed the factors that influence the adaptation of ISAs in different countries and organisations, as well as their impact on the practice of international auditing. The study showed that the adoption of International Standards on Auditing depends on institutional conditions in different countries, including the legal system, cultural factors, and the level of economic infrastructure.

Previous studies together provide an extensive overview of current issues and prospects in international auditing in the digital economy. However, specific strategies for adapting auditors to these challenges and evaluating their effectiveness in practice were rather neglected. The purpose of this study was to analyse the strategies used by auditors to successfully adapt to digital changes in the context of international auditing.

Materials and Methods

A comprehensive literature review was conducted to analyse the key trends, challenges, and innovations shaping the development of international auditing in the digital era. This review served as the foundation for understanding

how digital technologies, such as blockchain, artificial intelligence (AI), and big data analytics, are transforming auditing practices and the ethical implications of their integration. The analysis of blockchain technology by C. Cheng & Q. Huang (2020) highlighted its role in ensuring transparency and preventing financial data manipulation. Blockchain's ability to provide auditors with continuous access to an immutable transaction history reinforces trust in financial reporting and strengthens fraud detection mechanisms. Research on AI applications in auditing by I. Munoko *et al.* (2020) demonstrated its effectiveness in automating routine audit tasks, improving efficiency, and enhancing risk detection. Machine learning algorithms streamline data collection and classification, allowing auditors to shift their focus to strategic analysis and deeper financial assessments. Studies on big data analytics by G. Salijeni *et al.* (2019) emphasised its capacity to uncover hidden trends and anomalies in financial statements, providing auditors with advanced tools for risk identification and predictive analysis. The application of big data methodologies facilitates a shift from retrospective audits to real-time monitoring, significantly improving audit responsiveness. The review also explored the impact of globalisation and ethical standards in auditing (Eltweri *et al.*, 2021), underscoring the need for standardised international frameworks to enhance financial statement comparability across jurisdictions. The growing importance of ethical auditing principles, influenced by public scrutiny and corporate accountability demands, was identified as a key factor shaping modern auditing practices. A significant focus was placed on cybersecurity in international auditing (Lois *et al.*, 2021), addressing the increasing risks associated with digitalisation. Research findings highlighted the necessity of robust security measures, regular audits, and compliance with cybersecurity standards such as GDPR (2016) and ISO 27001 (2019) to mitigate cyber threats and protect financial data integrity.

Among the technological advancements examined in this study, particular attention was given to blockchain, AI, big data analytics, and cybersecurity innovations. Blockchain technology was analyzed for its ability to enhance transparency, prevent financial data manipulation, and improve trust in financial reporting through immutable transaction records. AI applications, especially machine learning algorithms, were studied in the context of automating routine audit processes, improving risk detection, and increasing the accuracy of financial assessments.

In addition to academic sources, the study incorporated materials from leading audit firms and regulatory institutions to provide a more practical perspective on digital transformation in auditing. Reports and case studies from Klynveld Peat Marwick Goerdeler (KPMG) (n.d.), Deloitte (Deloitte Ukraine Impact Report 2023-2024, 2025), and PricewaterhouseCoopers (PwC) (n.d.) were analysed to understand how major audit firms integrate cutting-edge technologies into their practices. These sources provided real-world examples of AI-driven automation, blockchain

implementation, and big data utilisation, demonstrating the practical applications of digitalisation in auditing. The research also relied on relevant information from industry reports, policy documents, and professional auditing organisations, but no direct data from general informational websites were used.

During the research, an integrated approach was used to investigate the strategies of auditors' adaptation to the challenges of the digital economy in international auditing. Examples of successful technology integration into auditing practice from large firms such as KPMG (n.d.), PwC (n.d.) and Deloitte were used (Deloitte Ukraine Impact..., 2025). These examples showed the practical effectiveness of the introduction and use of digital innovations such as AI, big data analysis, and cybersecurity. KPMG, which originates from the Netherlands, is one of the largest audit firms globally and has incorporated cutting-edge technologies like AI and data analytics into its auditing processes. Deloitte, based in the United States, has implemented blockchain technology and advanced cybersecurity measures to enhance audit quality and data protection. PwC, headquartered in the United Kingdom, has focused on integrating big data tools and machine learning algorithms to streamline audit tasks and ensure the accuracy of financial reporting. Through the review of their materials, it became clear how digital innovations have reshaped international auditing practices, offering more efficient solutions for complex auditing tasks and strengthening cybersecurity in the auditing process.

The study also used current standards such as General Data Protection Regulation (GDPR) (2016) and ISO 27001 (2019) to understand cybersecurity and data protection requirements in the context of auditing. All these materials provided a solid basis for the analysis and conclusions presented in the study and provide a holistic understanding of current challenges such as the need for auditors to adapt to new digital technologies, including blockchain and big data analytics, the impact of global economic trends.

Results

International audit, as an integral part of the financial infrastructure, is undergoing constant transformations, responding to the changing business environment, global economic shifts, and technological innovations. One of the main trends shaping the industry is digital transformation, which redefines auditing methods and approaches while significantly impacting financial stability and business efficiency. The integration of advanced technologies such as blockchain, AI, and big data analysis enhances audit accuracy and operational efficiency, reducing costs for companies and increasing the speed of financial reporting (Barr-Pulliam *et al.*, 2022). However, these innovations also introduce new economic challenges, including the costs of implementing advanced technologies, ensuring compliance with international regulatory frameworks, and maintaining competitiveness in a rapidly evolving global market.

Globalisation and harmonisation of auditing standards further underscore the economic necessity of unified

approaches across different countries. Consistent and comparable financial reporting strengthens investor confidence, facilitates cross-border investments, and enhances the stability of international capital markets. Auditors must now navigate complex regulatory environments while considering economic policies and financial risks specific to different jurisdictions. The establishment of ethical standards has become a crucial factor in maintaining financial credibility, as adherence to transparency and integrity directly influences market stability and corporate reputation (Eltweri *et al.*, 2022). Increasing public scrutiny and corporate responsibility expectations compel auditors to integrate ethical considerations into their decision-making processes, ensuring sustainable financial governance.

The growing emphasis on cybersecurity in international auditing reflects the economic risks associated with digital vulnerabilities. Cyber threats pose substantial financial consequences, including fraud, loss of sensitive financial data, and reputational damage that can impact global financial markets. As a result, significant investments in cybersecurity infrastructure and risk management frameworks are becoming indispensable. Moreover, workforce training and development play a pivotal role in adapting to new economic and technological realities. Upskilling auditors in data analytics, cybersecurity, and regulatory compliance is now a strategic imperative to maintain financial integrity and trust in the auditing profession (Slapničar *et al.*, 2022). Ultimately, the convergence of technological innovations, ethical governance, and global economic

considerations ensures the resilience and reliability of international auditing in the digital economy, reinforcing financial stability and fostering sustainable economic growth.

Digital technologies such as blockchain, AI, and big data analysis are dramatically reshaping auditing practices, providing new opportunities to improve the efficiency and reliability of international auditing. Blockchain, with its distributed data structure and the impossibility of falsification, plays a key role in improving transparency and trust in international auditing. This technology provides network participants with simultaneous access to a common registry, which significantly improves verification processes. However, the more important aspect is its ability to prevent data falsification. The unique hash codes in each block create a chain of dependencies, making manipulation of information noticeable and extremely difficult. The continuous transaction history provided by the blockchain is another important aspect for auditors. This allows them to have a complete overview of the company's financial operations since its inception. Such detailed transparency improves the analytical capabilities of auditors, allowing them to identify trends and risks (Han *et al.*, 2023). The use of blockchain in auditing also helps to prevent fraud and confirm the authenticity of data. Any changes in the block are instantly visible to all network participants, which creates an additional level of security. In the context of international auditing, where falsification of financial data can pose serious risks, such technological protection becomes very valuable (Table 1).

Table 1. Impact of audit digitalisation on the global economy and financial stability

Parameter	Traditional audit	Digital audit	Economic effect
Audit Duration	3-6 months	1-3 months	Reduction of company audit costs
Audit Costs	High due to labor intensity	Reduction due to automation	Increased business profitability
Accessibility for Small Businesses	Limited due to high cost	Increases due to automation	Expansion of the audit market
Fraud Risk	High	Decreases due to blockchain and AI	Increased trust in financial reporting
Regulatory Burden	High	Decreases due to automation	Simplification of compliance with standards

Source: compiled by the authors

The Table 1 presents a comparative analysis of traditional and digital audit practices, highlighting their impact on the global economy and financial stability. Digital audit significantly reduces the time required for auditing, from 3-6 months in traditional methods to 1-3 months, which leads to lower costs for companies. Automation plays a crucial role in reducing audit expenses, improving overall business profitability, and making auditing services more accessible to small businesses. The integration of blockchain and AI technologies helps mitigate fraud risks, increasing trust in financial reporting. Additionally, automation reduces regulatory burdens, simplifying compliance with international standards. Overall, the transition to digital auditing enhances efficiency, improves financial security, and contributes to the expansion of the audit market.

AI is significantly changing the nature of international auditing by introducing automation and intelligent functions into various aspects of auditing. This contribution of AI is expressed primarily in the automation of routine tasks such as data collection, document classification and fact-checking, which frees auditors from monotonous duties and provides them with the opportunity to take a more strategic approach to auditing. AI systems are used to effectively implement everyday tasks, which allows auditors to focus on more important and analytical aspects of their work. Machine learning algorithms integrated into these systems efficiently process vast amounts of data and identify unusual patterns and potential risks (Seethamraju & Hecimovic, 2023). They can be used, for example, to analyse financial transactions, identifying irregular

transactions or suspicious changes in the expenditure pattern. Such intelligent data analysis significantly improves the accuracy and efficiency of audits.

In the modern auditing environment, big data analysis is becoming an integral part of practice, playing a key role in improving the quality and depth of understanding of companies' financial statements. This technology provides auditors with the tools to more thoroughly investigate the vast amounts of information contained in the financial data of enterprises. One of the outstanding aspects of using big data analysis in auditing is the ability to identify hidden trends (Furmanchuk, 2023). Auditors can use algorithms and analysis techniques to process data arrays and identify entities that might go unnoticed with conventional methods (Appelbaum *et al.*, 2017). This opens up new perspectives for understanding the long-term dynamics and changes in the financial situation of the company. In addition, big data analysis is becoming a reliable tool for detecting anomalies in financial statements. This technology is able to automatically detect unusual patterns or inconsistencies, which can serve as a signal to auditors about possible problems or errors.

Modern auditing practice is undergoing significant transformations, introducing new technologies to improve efficiency, accuracy, and strategic analysis. In this context, a number of successful examples demonstrate how audit companies are actively implementing modern technologies to improve their operations. KPMG has demonstrated the successful use of AI to automate audit routines. AI systems were trained to recognise and classify financial documents, which significantly reduced the time previously spent by auditors on data collection and analysis (Ranjith *et al.*, 2021). This approach not only increased efficiency, but also allowed auditors to shift their attention to more strategic analysis. AI has acted as a reliable tool that provides fast and efficient processing of large amounts of information, freeing auditors from monotonous tasks and improving the quality of inspections.

Deloitte has successfully integrated big data analysis into its practice to detect fraud in customer financial statements. Machine learning algorithms were configured to detect anomalies in financial transactions, which significantly improved the ability of auditors to quickly identify potential violations and fraudulent schemes (Chien, 2020). This technological innovation has become an additional means of ensuring the security of audits, helping to maintain customer trust and enhance the company's reputation.

PwC has applied data analytics to pre-identify potential risks in clients' financial activities. Data analysis algorithms were set up to quickly identify unusual trends and changes in data, which ultimately improved the quality of advice and recommendations provided (Earley, 2015). This practice has allowed PwC auditors to be proactive in preventing potential problems, strengthening customer relationships and improving the overall effectiveness of consultations. All these examples highlight how innovations in technologies such as AI and big data analysis improve the

work of auditors, making them more efficient, responsible and able to respond quickly to changes in the financial environment of clients.

Auditing activities face increased challenges in the field of cybersecurity, in the context of rapid digital development. Protecting the confidentiality and integrity of customer data is becoming a priority, and auditors are actively applying strategies to minimise risks and maintain customer trust. First of all, employee training and awareness play a key role in ensuring cybersecurity. A real-world example includes Equifax, which in 2017 faced a major data security breach in which the personal information of more than 147 million people was compromised (Barrett, 2023). This incident highlights the need for strict cybersecurity standards, regular audits and continuous improvement of security systems to prevent such incidents. An auditing company such as KPMG implements cybersecurity training, including phishing and basic security measures. This creates a culture of security, reduces the level of social engineering and increases employee awareness of possible cyber threats. The successful experience is provided by Deloitte, which actively applies advanced security tools, including antivirus programmes, intrusion detection systems and multi-factor authentication. The use of modern technologies provides auditors with effective means of protection against a variety of cyber threats, preventing attacks and ensuring data integrity.

The digitalisation of audit has a significant impact on the international economy, financial stability and the audit services market, contributing to increased efficiency, reduced costs and increased confidence in financial statements. The introduction of modern technologies, such as AI, blockchain and big data analysis, allows us to optimise audit processes, reducing the time of audits and minimising the risk of human error. This increases the transparency of financial transactions and facilitates the detection of financial abuse, which has a positive impact on the international economy by strengthening financial regulatory institutions and increasing the investment attractiveness of markets. Financial stability depends to a large extent on the reliability and accuracy of audit reports, and digital technologies help reduce the risks of fraud, manipulation, and misrepresentation of financial information. Thanks to automation and the use of AI algorithms, auditors can analyse large amounts of data faster and more efficiently, which allows them to identify financial anomalies and predict possible threats to the business. This strengthens the credibility of audit reports and provides greater financial predictability, which is critical to the stability of the global economy.

The audit services market is also undergoing significant changes as a result of digitalisation, as traditional audit methods are giving way to automated processes, which reduces operating costs and makes auditing more affordable for small and medium-sized businesses. This contributes to the expansion of the audit services market, increasing competition and encouraging companies to implement the latest technologies to improve their efficiency. At the same time, digitalisation is changing the requirements for

the competencies of auditors, who are required not only to be proficient in financial analysis but also to have in-depth knowledge of cybersecurity, data analysis, and digital risk management. This contributes to the formation of a new level of professional standards, which ensures a better and more reliable audit in the digital economy.

The digitalisation of audit has a positive impact on the international economy, contributing to financial stability, increasing control efficiency and reducing risks. At the same time, it is transforming the audit services market, forcing companies to adapt to new conditions and invest in technological development. This is creating new opportunities for audit firms and financial regulators, while also requiring a strategic rethinking of the role of audit in the digital age.

Regular audits and penetration testing are a strategic element in ensuring cybersecurity. Conducting systematic audits helps identify and eliminate vulnerabilities at an early stage, ensuring that auditors' systems remain reliable and resilient to modern cyber threats (Zhurakovska & Sydorenko, 2023). Data encryption is also an important element of security. The implementation of encryption

during data transmission and storage provides an additional level of protection, preventing unauthorised access to confidential information. Access control and the creation of strict control policies is a strategy that allows regulating and monitoring employee access to data. Identity and access management (IAM) provides privilege control, minimising the risks of unauthorised access. Compliance with standards and regulations such as GDPR (2016) and ISO 27001 (2019) ensures universal safety standards. Compliance with these standards helps auditors build reliable security systems that meet global requirements and standards.

In general, ensuring cybersecurity in auditing requires not only the use of technological tools, but also the development of a safety culture among staff. The combined efforts of training, the use of modern tools, systematic inspections and compliance with standards provide a comprehensive approach to data protection and create a reliable environment for auditors in the era of digital transformation. In the context of these changes, Table 2 identifies key technologies that are being actively implemented in the audit environment.

Table 2. Technological innovations in auditing practice

Technology	Role in the audit	Advantages of implementation
Blockchain	Ensuring data security and transparency, preventing falsification, continuous transaction history	Improved data reliability, reduced fraud risk, increased trust
Artificial intelligence	Automation of routine tasks, rapid analysis of extensive data, identification of irregular patterns and potential risks	Efficiency, freeing up time for strategic analysis, improved accuracy
Big data analytics	Detection of hidden trends, identification of anomalies, preliminary identification of potential risks	Deep understanding of financial statements, enhanced analytical capabilities
Digital platforms for sharing experiences	Collaboration, exchange of knowledge and experience, coordination of efforts between audit specialists	Increased efficiency, improved coordination, quick access to expert information
Cybersecurity	Data protection from cyber-attacks, ensuring confidentiality and integrity of information	Preventing data leaks, maintaining customer trust, and complying with security standards

Source: compiled by the authors based on D. Barr-Pulliam *et al.* (2022)

Each of these technologies plays an important role in improving audit processes, providing higher security, more efficient data analysis and increased customer trust. The detailed study and successful implementation of these technologies reflect the auditors' commitment to a modern and innovative approach in the digital age.

In the context of the active introduction of digital technologies into the economy, international auditing in Azerbaijan is also undergoing significant changes and is developing, adapting to the challenges of the digital era. Azerbaijani firms in the audit sector can implement programs for automatic analysis of financial data, which will shorten the time frame and increase the accuracy of inspections. The transition from paper documentation to electronic formats will simplify the collection and exchange of data between clients and auditors. This will improve communication efficiency, reduce time costs, and facilitate more expeditious audits. Auditors in Azerbaijan can implement blockchain technologies for a more reliable

and impartial audit of financial transactions. With the increase in digital processes, attention to cybersecurity is also growing. Azerbaijani auditors are actively implementing strategies and tools to protect the confidentiality and integrity of their clients' data. Companies also make efforts to comply with international standards in auditing. This is important to maintain the trust of international clients and investors (Agamamed *et al.*, 2023). In general, the level of digitalisation of international auditing in Azerbaijan can be described as gradually developing. Auditors strive to use modern technologies to improve the efficiency and accuracy of their work, and the country as a whole is demonstrating readiness for digital transformation in the field of financial auditing.

As already mentioned, in order to effectively adapt to changes, active research and integration of advanced technologies are necessary. It is proposed to develop recommendations that consider these technological trends and encourage their active implementation by audit firms in

order to improve the efficiency and accuracy of the audit. It is recommended that cybersecurity standards be systematically strengthened, including regular audits of security systems and continuous improvement of security measures. New approaches to detecting and preventing cyber-attacks may include the use of AI and big data analysis to identify anomalies and prematurely detect potential threats. The next important aspect is the standardisation of the use of blockchain technology. The development of innovative standards should ensure the security, transparency, and authenticity of data in the audit process. Updating educational programmes for auditors involves the introduction of new topics related to the use of blockchain technologies in auditing, and an emphasis on the practical application of this knowledge. To promote new standards and methods of international auditing, it is necessary to introduce advanced technologies such as data analytics, machine learning, and deep learning algorithms. The active use of digital platforms and tools for sharing experiences and coordinating efforts also gives an innovative character to this process.

In order to maintain the focus on ethics and responsibility in a digital environment, it is recommended to specifically implement standards highlighting the importance of ethical principles and responsible use of technology in the audit process. This can be ensured by setting up advisory groups where various experts can share their experiences and develop specific recommendations for improving standards. The development of flexible and adaptive standards in a rapidly changing digital environment involves new methods of regulation and management, including the use of digital transformation technologies to ensure prompt response to changes. This may include the introduction of innovative risk assessment and change management methods. These recommendations are intended to specifically create a balanced and innovative approach to international auditing in the digital age, ensuring a high level of efficiency, reliability, and ethics in the audit process.

Discussion

The findings of this study highlight the significant impact of digital transformation on international auditing practices. The convergence of advanced technologies, the process of globalisation and the evolution of regulation are reshaping the traditional audit landscape. The integration of technologies such as blockchain, AI, and big data analysis is a paradigm shift in auditing methods. The role of blockchain in ensuring data security and transparency is key, introducing a level of trust and reliability previously unavailable. The immutable nature of the blockchain facilitates the creation of a continuous transaction history, providing auditors with unprecedented research opportunities in the operations of financial companies. AI, with its automation capabilities, frees auditors from routine tasks, allowing a more strategic approach to complex analyses. The use of machine learning algorithms improves audit efficiency and accuracy by quickly identifying unusual patterns and potential risks. Big data analysis is becoming a

key tool, uncovering hidden trends and anomalies in vast datasets, providing auditors with a deeper understanding of financial statements (Llazo *et al.*, 2024).

The globalisation of auditing standards highlights the need to unify approaches in diverse cultural and regulatory environments. Auditors face the challenge of navigating intriguing cultural and regulatory intricacies while ensuring consistency and comparability of financial statements at the global level. This requires a deeper understanding of international ethical standards, which is key in maintaining the trust of stakeholders in conditions of increased public scrutiny. As digital technologies penetrate audit practice, the urgency of strengthening cybersecurity measures increases. The examples of Equifax and KPMG highlight the critical need for strict cybersecurity standards, regular audits, and continuous system improvements to prevent data leaks. The proactive approach of audit firms such as KPMG and Deloitte in employee training, penetration testing and encryption reflects the desire to ensure the security of customer data and maintain industry confidence. The fusion of technology, ethics, and global collaboration guides international auditing practices into a new era. Successful examples of firms actively implementing digital technologies highlight the transformational potential of these innovations (Gulaliyev *et al.*, 2023).

Scientists C. Cheng & Q. Huang (2020) provided an extensive analysis of blockchain's role in international auditing, emphasising its capability to prevent financial data manipulation and enhance transparency. Their research particularly focused on continuous auditor access to complete transaction histories, facilitated by blockchain's decentralised and immutable nature. This aspect is consistent with the present study, which also identifies blockchain as a critical technology for ensuring data reliability. However, while C. Cheng & Q. Huang (2020) concentrated on the accessibility of financial transaction records, the present study extends this discussion by emphasising blockchain's role in strengthening fraud detection mechanisms and enhancing trust in financial reporting. The additional focus on how blockchain minimises audit risks and reinforces investor confidence adds a new dimension to the analysis, suggesting that blockchain's application in auditing is not limited to transaction verification but extends to broader financial risk management (Berisha & Rexhepi, 2022).

Researchers I. Munoko *et al.* (2020) conducted a thorough analysis of the impact of AI on international auditing practices. Special attention was paid to the consequences of the introduction of AI, identifying significant improvements in the efficiency and accuracy of audit processes. The researchers examined in detail how machine learning algorithms are used to perform routine operations such as data collection, document classification, and fact-checking. This allows significantly reducing the time that auditors previously spent on monotonous duties, and free up resources for a more strategic and analytical approach to auditing activities. Getting rid of routine tasks gives specialists the opportunity to study financial statements more

thoroughly, identify trends and risks, which, in turn, increases the quality and value of auditing activities. These results correlate with the findings of this study, highlighting the significant impact of AI on improving the efficiency and accuracy of audit processes. The findings of I. Munoko *et al.* (2020) align with this study in emphasising the transformative impact of AI on international auditing practices. Both studies highlight how AI enhances efficiency and accuracy by automating routine tasks such as data collection, document classification, and fact-checking. By significantly reducing the time spent on manual processes, AI enables auditors to focus on more strategic, analytical aspects of auditing, leading to improved financial statement evaluations and risk identification.

A key similarity between authors and this study is the emphasis on machine learning algorithms as a central tool for detecting financial anomalies. AI-driven systems analyse large datasets to identify irregular patterns that might indicate fraud, errors, or financial misstatements (Aizenberh, 2024). This aligns with the present study's findings, which demonstrate that AI not only automates auditing processes but also strengthens fraud detection and financial risk assessment. The results of both studies suggest that AI-driven audits enhance financial transparency and help prevent fraudulent activities by quickly analysing vast amounts of financial data that would be impossible for human auditors to process manually.

The findings of G. Salijeni *et al.* (2019) align with the conclusions of this study, emphasising the transformative role of big data analysis in international auditing. Both studies highlight the ability of large-scale data analysis to enhance the depth and accuracy of financial investigations, enabling auditors to identify explicit and hidden trends within corporate financial data. The use of algorithms and advanced data analysis techniques significantly improves audit efficiency, allowing for a more comprehensive assessment of a company's financial position. A key aspect emphasised in G. Salijeni *et al.* (2019) is the ability of big data analytics to detect financial anomalies and emerging risks, a conclusion also supported by this study. By leveraging advanced analytical tools, auditors can recognise unusual patterns in financial statements, thereby improving fraud detection and risk assessment. The present study extends this discussion by examining how predictive analytics and real-time data processing enhance proactive risk management, providing auditors with the ability to anticipate financial instabilities before they materialise. This predictive capability is particularly crucial in a rapidly evolving global economic landscape, where financial uncertainties require continuous monitoring. Authors highlight how rapid anomaly detection enables auditors to act promptly when irregularities arise. This aligns with the findings of this study, which emphasize that big data allows auditors to conduct more dynamic audits, shifting from traditional retrospective analysis to real-time financial oversight. The shift towards continuous auditing enhances transparency and strengthens

financial governance by reducing the lag between financial reporting and anomaly detection.

A. Eltweri *et al.* (2021) focused on the problems of globalisation and ethical standards related to the practice of international auditing. Their study highlights several key aspects reflecting current trends in the auditing field. The main focus of the study is the need to develop common approaches to auditing in different countries. The researchers emphasise the importance of agreed standards to ensure consistency and comparability of financial statements of companies at the global level. This emphasis offers a perspective on how global aspects influence methods and approaches in auditing activities. Another significant element of the study is the emphasis on the development of ethical standards as an integral part of a successful international audit. Ethical principles are becoming increasingly important in light of increasing public pressure and demands for accountability.

A significant contribution of A. Eltweri *et al.* (2021) is the emphasis on ethical principles as a cornerstone of successful international auditing. Their study highlights that increasing public scrutiny and demands for corporate accountability necessitate stronger ethical guidelines in auditing. This perspective complements the present research, which also underscores the critical role of ethical standards in maintaining financial credibility and stakeholder trust. However, the current study expands upon this discussion by integrating technological innovations into the ethical dimension of auditing, illustrating how emerging technologies such as AI and blockchain contribute to enhancing audit integrity and transparency. By reducing human intervention in financial reporting and implementing decentralised verification mechanisms, digital innovations serve as additional safeguards against fraud and manipulation, thereby reinforcing ethical auditing practices (Spytska, 2023). Both studies acknowledge the challenges posed by globalisation in auditing, particularly the complexity of navigating diverse regulatory environments. While A. Eltweri *et al.* (2021) focus on theoretical aspects of standard harmonisation, the present study expands on these considerations by analysing how digital transformation facilitates the unification of auditing standards. Digital tools, such as AI-driven compliance monitoring and blockchain-based financial record-keeping, enable audit firms to align their procedures with international regulations more efficiently, thereby mitigating the inconsistencies associated with national regulatory variations.

P. Lois *et al.* (2021) attached particular importance to cybersecurity issues in the field of international auditing. The researchers emphasise the relevance and importance of modern challenges and threats in the digital environment, especially in the context of increasing digital dependence. The field of international auditing is facing new and complex challenges related to data security in the digital age. In the context of growing digital dependence, the warnings about the importance of strict cybersecurity standards, regular audits, and continuous improvement of systems to

protect customer data are crucial (Kalyuzhna et al., 2024). Improving customer data protection systems is an ongoing process that must adapt to new attack methods and technological innovations of attackers. A key aspect highlighted by P. Lois et al. (2021) is the adaptability of cybersecurity systems to counteract emerging attack methods. This perspective is consistent with the conclusions of the present study, which underscores the necessity of real-time security updates, penetration testing, and the implementation of encryption and multi-factor authentication to mitigate cyber risks. Both studies agree that ensuring cybersecurity in auditing is not a static process but a dynamic effort requiring continuous monitoring and adaptation.

While P. Lois et al. (2021) primarily focuses on the defensive measures needed to protect audit firms and client data, the present study expands the discussion by integrating the role of regulatory compliance and standardisation in strengthening cybersecurity frameworks. The implementation of international cybersecurity regulations, such as GDPR and ISO 27001 (2019), is emphasised as a crucial factor in maintaining data integrity and protecting audit firms from reputational and financial risks. Study highlights the impact of cybersecurity on stakeholder trust and financial stability. The ability of audit firms to safeguard sensitive financial information directly influences investor confidence and the reliability of financial reporting. However, the present study further explores how technological innovations, such as blockchain, can enhance cybersecurity by ensuring data immutability and transaction transparency, reducing the risk of financial manipulation. This integration of cybersecurity with digital auditing technologies presents a more comprehensive approach to mitigating risks.

In general, previous research covers important aspects of the audit field, including technological innovations, the impact of AI, big data analysis, ethical standards and cybersecurity, reflecting the complexity and relevance of modern challenges in international auditing.

Conclusions

The conducted research highlights the economic impact of digital transformation in international auditing, emphasising its role in financial stability, investment attractiveness, and market competitiveness. The adoption of blockchain enhances transparency and fraud prevention, strengthening

investor confidence and reducing financial risks. Artificial intelligence and machine learning cut operational costs, increase audit efficiency, and expand access to auditing services, benefiting small and medium-sized enterprises. Big data analytics enables predictive financial assessments, improving risk management and financial planning.

The integration of these technologies by KPMG, Deloitte, and PwC demonstrates cost reduction, efficiency gains, and higher profitability, reinforcing market competitiveness. The broader macroeconomic implications of digital auditing include greater financial stability, enhanced global market trust, and increased foreign investment flow. Digital transformation is thus not only a technological shift but a key driver of economic sustainability and business growth.

Globalisation and harmonisation of standards in international auditing emphasise the importance of unifying audit approaches in different countries. This trend seeks to ensure consistency and comparability of financial statements of companies at the global level, which requires auditors to have a deep understanding of the cultural and regulatory characteristics of different markets. In addition, the study revealed the relevance of cybersecurity in international auditing, highlighting the threats posed by the digital environment. Effective cybersecurity requires not only the use of technological tools, but also the development of a safety culture among staff. In the context of Azerbaijan, the study highlights the readiness for digital transformation in auditing. Recommendations include strengthening cybersecurity standards, standardising the use of blockchain and actively implementing modern technologies.

Further research may focus on the development of innovative methods for managing risks and changes in the digital audit environment, and on the development of effective educational programmes for auditors supporting a wide range of digital skills.

Acknowledgements

None.

Funding

None.

Conflict of Interest

None.

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Організація та напрямки розвитку міжнародного аудиту в умовах цифрової економіки

Фазіл Гаджиєв

Старший викладач

Азербайджанський державний економічний університет
AZ1001, вул. Істікляліят, 6, м. Баку, Азербайджан
<https://orcid.org/0000-0003-4675-3393>

Нусрет Бабаєв

Доктор наук, професор

Азербайджанський державний економічний університет
AZ1001, вул. Істікляліят, 6, м. Баку, Азербайджан
<https://orcid.org/0000-0001-8827-3617>

Фуад Гасімов

Кандидат наук, викладач

Азербайджанський державний економічний університет
AZ1001, вул. Істікляліят, 6, м. Баку, Азербайджан
<https://orcid.org/0009-0005-7661-6850>

Анотація. Метою цього дослідження був аналіз впливу цифрових технологій на міжнародну аудиторську практику. Було застосовано інтегрований підхід, який включав комплексний огляд літератури, аналіз прикладів основних аудиторських фірм і вивчення міжнародних нормативних стандартів для оцінки цього впливу. У цьому дослідженні розглядалася нагальна необхідність адаптації міжнародного аудиту до цифрової трансформації, підвищення фінансової прозорості, ефективності витрат, запобігання шахрайству та стабільності глобального ринку завдяки інтеграції блокчейну, штучного інтелекту та аналітики великих даних. Було виявлено проблеми, пов'язані з необхідністю адаптації до нових технологій, таких як блокчейн і аналіз великих даних, вплив глобальних економічних тенденцій на фінансову звітність, а також різні підходи до уніфікації стандартів аудиту та етики на міжнародному рівні. Дослідження визначило, як ці технології сприяють зниженню витрат на аудит, підвищенню операційної ефективності та покращенню фінансової прозорості, що, у свою чергу, зміцнює довіру інвесторів і підвищує стабільність фінансових ринків. Зазначено, що інтеграція блокчейну забезпечує запобігання шахрайству та надійність фінансових даних, знижуючи економічні ризики, пов'язані з фінансовими викривленнями та корпоративним шахрайством. Доведено, що аналіз великих даних покращує оцінку ризиків і прогнозу фінансову аналітику, дозволяючи компаніям приймати більш обґрунтовані інвестиційні та стратегічні рішення. Результати можуть стати основою для розробки стратегій і тактик впровадження цифрових інновацій у практику міжнародного аудиту, надання інструментів і рекомендацій аудиторським компаніям, регуляторам і організаціям.

Ключові слова: технологічний прогрес, кібербезпека, технології блокчейн, аналіз великих даних, стандарти, міжнародний аудит