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The Application of Artificial Intelligence in Accounting and Taxation Based on Expert Assessments

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ABSTRACT

This study examines the theoretical, methodological, and applied aspects of integrating artificial intelligence (AI) into accounting systems and tax administration using expert evaluation methods. A systematic review of contemporary academic literature clarifies the conceptual foundations of AI and its role in the digital transformation of accounting and fiscal processes. The analysis focuses on the automation of accounting and managerial operations, intelligent accounting information systems, and virtual assistants for tax compliance and automated reporting. Selected applications, including Robotic Process Automation (RPA), accounting software robots (RobBee), and the DavrOn virtual assistant, illustrate the practical potential of intelligent technologies in financial and tax management. The results indicate that AI-based solutions can improve operational efficiency, data reliability, procedural transparency, and the adaptability of managerial decision-making as data complexity increases.

Keywords: Artificial intelligence ▪ Accounting and taxation ▪ Digital transformation ▪ Expert assessment ▪ Expert survey methods ▪ Tax system modernization

1. INTRODUCTION

In the contemporary economic environment, accounting and taxation constitute a core informational foundation of organizational management, ensuring the systematic recording and interpretation of business transactions, financial performance, asset structures, and tax obligations. As economic processes become increasingly complex and information requirements intensify, the functional role of accounting has evolved substantially. Accountants have moved beyond a predominantly transactional focus and increasingly perform analytical, advisory, and strategic functions, supporting managerial decision-making and long-term organizational sustainability. The expansion of accounting responsibilities is closely associated with the need to identify and assess financial and tax risks, develop mechanisms for their mitigation, optimize tax burdens and transaction costs, and provide analytical support for strategic planning. Under these conditions, accounting can no longer be regarded solely as a technical system for recording economic operations; rather, it assumes a systemic role within the architecture of corporate governance, financial control, and strategic management. Consequently, accountants increasingly act as strategic partners who not only ensure compliance with regulatory requirements but also contribute to achieving organizational performance and competitiveness.

Accelerated digitalization of the economy, the proliferation of remote and hybrid forms of employment, and the rapid diffusion of information and communication technologies have led to a sustained increase in academic and practical interest in the application of artificial intelligence (AI) within accounting and tax administration. In this context, artificial intelligence is understood as a set of computational models,

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algorithms, and software solutions designed to automate analytical functions, process large volumes of data, perform forecasting, and support decision-making under conditions of high informational complexity. The integration of artificial intelligence with automated accounting systems creates qualitatively new opportunities for optimizing accounting procedures, enhancing the accuracy, consistency, and comparability of financial and tax reporting, and reducing operational and compliance-related risks. The adoption of AI-based solutions contributes to the emergence of data-driven management models, in which managerial decisions are increasingly based on systematic data analysis rather than solely on professional intuition or subjective judgment. From a broader economic perspective, the diffusion of AI and automation technologies supports productivity growth and opens new opportunities for business development in the context of digital transformation. At the global level, the development of artificial intelligence is recognized as a strategic driver of scientific and technological progress and national competitiveness. Competition for leadership in AI development has become a priority for many countries, including the United States, China, Japan, Australia, Brazil, Canada, Russia, and the member states of the European Union, which actively implement AI technologies while simultaneously establishing legal, institutional, and ethical frameworks for their governance. Within this broader context, the integration of artificial intelligence into accounting and taxation has emerged as a distinct and rapidly developing field of academic research and applied analysis.

A substantial body of contemporary research examines the transformative impact of artificial intelligence on accounting, taxation, and public finance. Scholars such as David Autor, Richard Susskind, Edward Felten, Michael Jordan, A. Spielman, A. Konushin, V. Malykh, A. A. Udalova, A. V. Sosnovskaya, and A. S. Andyka analyze institutional, technological, and managerial implications of AI adoption, as well as its influence on information quality and decision-making effectiveness. In Uzbekistan, this research agenda is actively developed by S. S. Gulyamov, Sh. Mirzaev, U. Yuldashev, M. Kamilova, B. Salimov, S. Bekmurodov, Sh. Tursunov, and A. Abdugafarov, whose works contribute to the theoretical and applied understanding of AI implementation in national accounting and tax systems. The diffusion of digital technologies has triggered profound structural changes in economic systems, business models, and information flows, necessitating the adaptation of accounting methodologies to conditions characterized by algorithmization and the processing of heterogeneous data sets. At the same time, the implementation of artificial intelligence is associated with a range of challenges, including institutional resistance to innovation, skepticism toward automated decision-making, shortages of qualified personnel, increased complexity of data processing, and substantial initial investment costs [1, 2, 3, 4, 5].

Despite these constraints, empirical evidence indicates a gradual expansion of artificial intelligence applications in accounting and taxation, extending beyond large corporations to include small and medium-sized enterprises. The use of AI technologies reduces the influence of human error, improves the accuracy of calculations and reporting, and enhances the overall efficiency of accounting and tax-related processes, particularly in the area of tax administration. Effective and responsible implementation of artificial intelligence in accounting and tax systems requires a robust methodological framework capable of assessing the feasibility, effectiveness, and risks associated with AI-based solutions. In this regard, expert evaluation methods play a particularly important role, as they enable the integration of professional judgment into the analysis of digital transformation processes under conditions of regulatory complexity and informational uncertainty. Expert-based approaches provide a systematic basis for assessing organizational readiness for AI adoption, determining the functional relevance of intelligent tools, and forecasting their impact on the performance of accounting and tax administration. Thus, artificial intelligence represents a significant transformational factor in the development of accounting and taxation. The formulation and application of expert-based methodological approaches constitute a necessary condition for its sustainable, transparent, and effective integration within the digital economy, as well as for the further digitalization and intellectualization of accounting, taxation, and audit systems [6, 7, 8, 9, 10].

2. RELATED WORK

This study explores new approaches to simplifying the tax system, incorporating modern tax control tools, and utilizing artificial intelligence in accounting and taxation through expert assessments. However, despite adhering to all regulatory rules and technologies at the operational stage, digital technologies in the tax system and interactive public services significantly lag behind international standards in terms of quality and durability. This discrepancy indicates that technologies and regulatory documents may either be outdated or not aligned with local specifics.

The successful preparation of project documentation often relies on the structures that actively participate in the process. Corruption within the tax interactive services system occurs subtly and is challenging to detect. Nonetheless, uncovering corruption in the tax system requires a thorough and objective analysis of the outcomes of the services provided and the work performed. We believe that a major issue stems from the excessive ambition of corrupt officials who leverage the lobbying of competing companies for personal gain during the implementation of digital technology projects in the tax sphere. As a result, the costs of introducing these digital technologies into the tax system and interactive services are rising, while quality and reliability deviate significantly from established standards.

One of the key aspects of such projects is the accurate accounting of actual costs and operational timeframes. We propose a new "bottom-up" approach for introducing modern digital technologies and artificial intelligence into the tax system of Uzbekistan, based on expert assessments. This method emphasizes the gradual integration of contemporary methods, programs, and communication technologies into the tax system's framework. Throughout the implementation process, it is essential to comply with the regulations of the State Tax Inspectorate and to conduct a state examination.

Qualified experts and specialists are necessary to thoroughly assess and analyze the effectiveness of integrating modern digital technologies into the tax system. At each stage of digitizing tax system projects, a sample survey of experts is

conducted. These experts should possess a substantial amount of objective and valuable information in the field of taxation, making them vital sources of both qualitative and quantitative data.

Initially, working groups and expert groups are formed to adopt the expert approach. The working group is responsible for collecting and analyzing questionnaires containing expert assessments to monitor the survey process. Subsequently, the expert group calculates the total score for each factor, evaluating the overall score using significance coefficients for each factor.

In this instance, the questionnaire was developed to survey experts in the city of Samarkand for 2023. The survey involved leading specialists in tax legislation and modern digital technologies. The questionnaire consists of 10 questions, which 12 experts rated on a 10-point scale. Each expert assessed the relevance of the problem from 1 to 10, with 10 indicating the most significant issue and 1 indicating the least significant [11, 12, 13, 14, 15]. The questionnaire includes the following relevant questions:

1. How would you evaluate the effectiveness of modern digital technologies and programs implemented in the tax system and accounting?
2. What is your opinion on conducting selective surveys of experts regarding the transparency of tax and accounting laws?
3. How satisfied are you with the quality of interactive public services provided by the soliq.uz website and the my.soliq.uz portal?
4. How do you assess the competence of tax service managers and the knowledge of tax service employees?
5. Does the overall tax burden in the Republic of Uzbekistan (currently at 27%) meet your expectations?
6. What is your attitude toward tax penalty rates for violations of tax laws?
7. What is your opinion on the gradual reduction and optimization of the number of taxes and other mandatory payments?
8. How do you evaluate the work of the coordination council regarding planned tax audits of individuals and legal entities in Uzbekistan?
9. Do you believe that improving the quality and expanding the availability of electronic government services will significantly reduce corruption levels?
10. Do you think there is corruption within the tax structures of Uzbekistan?

Digitalization and artificial intelligence in tax administration and taxation systems are crucial for modern economic development. The introduction of modern digital technologies and AI-based programs significantly enhances the monitoring of the tax burden on businesses and reduces the time spent on transactions between taxpayers and tax authorities. The gradual implementation of these digital innovations, as evaluated by experts, is relevant and necessary for effective control over the operations of the tax service and the processing of citizens' appeals [16, 17, 18].

3. MATHEMATICAL EQUATIONS, SUBSECTIONS, TABLES, AND FIGURES

The expert evaluation method is crucial in enhancing the efficiency of management systems within tax structures. This study investigates the effectiveness and quality of modern tax control tools and the application of artificial intelligence in accounting and taxation through expert assessments. This method is especially relevant in scientific research, where quantitative analysis and evaluation methods may be limited or reliable information about current reporting is lacking.

When examining research factors, experts often face disagreements on complex issues, highlighting the need to quantify the level of agreement among them. Establishing a measure of consistency allows for a clearer understanding of the reasons behind differing opinions. Below, the most commonly used methods for processing and presenting data are described. These methods can be applied to any set of primary statistical data.

Table 1 showcases the scores assigned by 12 experts based on a questionnaire consisting of 10 questions. These responses were collected from various organizations, including private, state, and public entities, for the 2022 reporting year in Samarkand.

The processing of the assessments begins after the data from the experts have been collected. The data are summarized, and average values for each set of S_j-questions are calculated. To establish a quantitative evaluation of the factors, a simple ranking method is employed. Table 1 provides a general overview of the results compiled into a single table. The consolidated expert opinion is obtained using mathematical statistics, and the average rank of each factor, or the mean statistical value of S_j, is determined:

$$S_j = \frac{\sum_{i=1}^{n} a_{ij}}{m_j}. \tag{1}$$

Here, S_j is the average value of the factors, a_{ij} is the expert's assessment of the j-factor, and m_j is the number of experts evaluating the j-factor. The index i denotes the expert's number, and j the factor's number.

The next step is to determine the average rank of the set of factors in the research:

$$\bar{S} = \frac{\sum_{j=1}^{n} S_j}{n}. \tag{2}$$

The next step is to calculate the deviation of the average rank of the j-th factor from the average rank of the set of factors:

$$d_j = \bar{S} - S_j. \tag{3}$$

Table 1 presents the results of the calculation of actual data. Determining the consistency of expert opinions was an important part of the study. For this purpose, the concordance

Table 1. Expert scoring assessment of factors

Factor	Experts												Sum of ranks	Deviation from average sum of ranks	Squared deviations of sum of ranks
	1	2	3	4	5	6	7	8	9	10	11	12			
1	4	3	4	3	3	4	3	3	3	3	4	4	41	-36	1296
2	3	4	5	4	3	3	4	3	4	4	4	3	44	-33	1089
3	5	4	3	5	4	4	4	3	4	3	3	4	46	-31	961
4	3	4	3	3	4	5	5	3	4	3	5	4	46	-31	961
5	7	9	9	8	9	7	6	8	9	7	9	8	96	19	361
6	7	7	9	7	9	7	8	9	7	9	7	9	95	18	324
7	8	9	7	9	7	9	8	7	9	7	9	7	96	19	361
8	8	8	8	9	8	9	8	9	9	8	8	8	100	23	529
9	8	9	8	8	9	9	8	9	8	9	9	9	103	26	676
10	9	9	8	9	9	8	8	9	8	9	7	9	102	25	625
Total	62	66	64	65	65	65	62	63	65	62	65	65	769	–	7183

coefficient K was calculated using the formula:

$$K = \frac{12\sum_{j=1}^{n} d_j^2}{m^2(n^3 - n)}. \tag{4}$$

The obtained values allow the calculation of the concordance coefficient and enable the conclusion of the degree of agreement among expert opinions based on the Chaddock scale (Table 2). The coefficient for the observed data is

$$K = \frac{12 \times 7183}{12^2(10^3 - 10)} = \frac{86196}{142560} = 0.61.$$

The obtained value of 0.61 is close to one, indicating a notably high level of agreement among expert opinions. This value of the concordance coefficient suggests that the experts' opinions are consistent, and therefore, the quality of the assessment can be considered significantly high. The strong consensus among experts reflects the reliability of the data obtained. As a result, the assessment process effectively identified the most modern and effective methods for integrating digital technology into the tax structure [19, 20].

Table 2. Chaddock scale for assessing the consistency of expert opinions

Quantitative measure of correlation strength	Qualitative characterization of bond strength
0.1–0.3	Weak
0.3–0.5	Moderate
0.5–0.7	Noticeable
0.7–0.9	High
0.9–1.0	Very high

The results of expert assessments indicate a positive evaluation of the quality and effectiveness of modern tax control tools and the application of artificial intelligence (AI) in accounting and taxation, based on insights from Samarkand. Statistical analysis of the current state of digital technologies and AI implementation shows that an expert approach is the most suitable and effective method for monitoring the quality of interactive services provided by tax authorities.

Based on the data and expert assessments gathered, we propose updating Uzbekistan's laws and regulations in the field of taxation using this expert approach. Moreover, at each stage of incorporating digital technologies and AI into the tax system and its interactive services, the following requirements and recommendations should be considered:

- Engage qualified experts in the use of modern digital technologies and AI.
- Optimize information flows, centralize tax information, and strengthen the cybersecurity of information systems.
- Develop high-quality, transparent interactive public services for taxpayers.
- Study the experiences of other countries to create new rules and standards for utilizing digital technologies and AI.
- Ensure compliance with national and international quality standards for implementing digital technologies within tax systems.
- Establish new standards and rules for digital technology use, informed by the practices of other nations.
- Enhance the quality and effectiveness of investments in digital technologies for tax system initiatives.
- Support the growth of innovative companies building the national digital infrastructure.
- Develop recommendations for market-based methods to evaluate the effectiveness of digital technology implementation, considering available resources.
- Implement advanced tax calculation methods in the global information system.

Modern methods of incorporating digital technology and AI into the tax system have significant potential. The tax system is a crucial component of the economy, and in today's world, it is important to initiate careful digitalization within this sector. The social importance of taxation, along with various

economic and political factors, supports this perspective. A unified information and calculation center can enhance social security, improve decision-making quality, and increase oversight of tax system services.

AI can simplify routine tasks, boosting productivity without replacing the professional expertise and skills of specialists. In accounting, AI has the potential to significantly transform work processes, increasing their efficiency and accuracy. Its application in the tax realm offers possibilities for automating and optimizing everyday operations, improving taxpayer services, and streamlining taxation procedures. These initiatives aim to create a safe and transparent environment for implementing AI in taxation and accounting, where innovations align with the protection of public interests. Ultimately, these efforts strive to develop an integrated infrastructure that supports the successful incorporation of AI as a key contributor to sustainable economic growth and innovation. These advancements are particularly important for reforming tax administration in the Republic of Uzbekistan, making it more modern and effective. Therefore, the introduction of artificial intelligence into Uzbekistan's tax system holds great promise for enhancing the efficiency, transparency, and modernization of tax administration [21, 22, 23].

4. CONCLUSION

The findings of this study confirm that the integration of artificial intelligence technologies combined with formalized expert evaluation methods constitutes a key driver of effective digital transformation in accounting and tax administration. The interaction between intelligent algorithms and expert-based analytical approaches enhances the quality of managerial decision-making, improves tax control mechanisms, and supports the development of risk-oriented management models.

The application of artificial intelligence together with expert assessment procedures significantly reduces routine operations, minimizes subjective bias, and increases the transparency of financial and tax processes. The use of software robots and analytical platforms enables the reallocation of professional efforts toward higher-value analytical and strategic tasks, which is consistent with the requirements of a data-driven digital economy.

At the same time, the study demonstrates that full automation of accounting and tax processes remains constrained by institutional and financial limitations, the complexity of certain accounting calculations, shortages of qualified personnel, and the continued necessity of professional judgment in strategic decision-making. Under these conditions, artificial intelligence should be regarded not as a substitute for human expertise but as a tool for strengthening expert potential and analytical capacity.

The effective implementation of digital reforms in the tax sphere requires the development of professional human capital and the systematic incorporation of expert evaluation mechanisms that ensure transparency, sustainability, and adaptability of tax administration systems. The Republic of Uzbekistan possesses the necessary institutional and technological prerequisites for further advancement of digital tax transformation. In this context, the development of expert-based methodologies represents a strategically important direction for building an intelligent ecosystem of tax governance in the digital economy.

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