Examining the Challenges and Opportunities of Artificial Intelligence in the Accounting Profession in Iran

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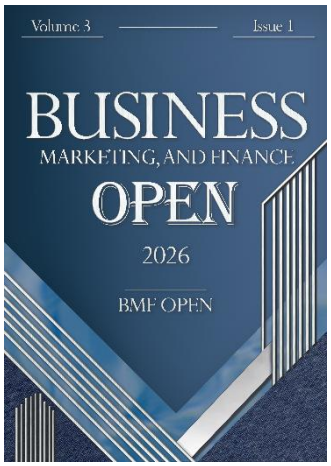

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Abstract: The present study investigates the challenges and opportunities of artificial intelligence (AI) in the accounting profession in Iran. This is a mixed-methods research in which thematic analysis was employed for the qualitative phase, and a descriptive-survey method was used in the quantitative phase. Data collection methods included both library and field approaches. Data collection tools consisted of questionnaires and interviews. The statistical population comprised professionals in the Iranian accounting field. Using purposive sampling through theoretical saturation, 13 academic experts were selected for the qualitative phase. In the quantitative phase, a simple random sampling method was employed, and based on Morgan's table, a sample size of 200 participants was determined. The identified model was analyzed using structural equation modeling and the software packages SmartPLS (version 3) and SPSS (version 23). The research findings revealed that the most significant opportunities provided by AI, in order of priority, include intelligent accounting, cost management, reduction of human errors, and online auditing. The most critical challenges identified include data insecurity, increased fraud, failure to implement organizational policies, and uncertainty. Accordingly, to benefit from artificial intelligence, the Iranian accounting profession must take the identified components into serious consideration.

Keywords: Artificial Intelligence, Accounting, Auditing.

1. Introduction

The rapid evolution of artificial intelligence (AI) has introduced a transformative wave across industries, reshaping operational structures, business models, and professional paradigms. Among these, the accounting profession stands out as a critical domain undergoing substantial transformation due to AI-powered technologies. From intelligent data processing to predictive analytics and ethical auditing, the integration of AI into accounting practices offers a spectrum of unprecedented opportunities and challenges, particularly in emerging economies like Iran. The imperative to investigate these dual aspects—opportunity and risk—within the Iranian context is grounded in the global momentum of AI adoption and its potential to reconfigure accounting systems both structurally and functionally.

Artificial intelligence encompasses a range of technologies including machine learning, natural language processing, and robotic process automation, all of which are increasingly embedded in accounting operations such as bookkeeping, financial forecasting, fraud detection, and auditing [1, 2]. These tools promise higher accuracy, speed, and analytical depth, which collectively contribute to the evolution of smart accounting systems. In

developing countries, where accounting practices are often constrained by manual operations and limited technological infrastructure, AI integration can bridge performance gaps and align local practices with international standards [3, 4]. However, the incorporation of AI into accounting also raises ethical, legal, and technical concerns that merit close attention.

One of the primary opportunities offered by AI in accounting lies in automation, which enhances efficiency and reduces human error in routine tasks [5]. Automation allows professionals to shift focus from transactional duties to strategic financial planning and decision-making [6]. For instance, AI-enabled systems can perform real-time audits, automatically flag irregularities, and generate compliance reports, significantly reducing the workload of human auditors [7]. Such systems are particularly beneficial in handling big data, a feature that aligns well with contemporary accounting environments characterized by high-volume, high-velocity data streams [8]. In this light, AI acts as an enabler of intelligent accounting, a paradigm that transcends traditional data entry to deliver insights and foresight.

Predictive modeling is another significant advantage of AI, allowing accountants to simulate future financial scenarios based on historical data and machine learning algorithms [5, 9]. This capability is crucial for risk assessment, budgeting, and financial planning. AI-powered analytics also supports earnings forecasting and earnings management detection, thereby reinforcing the integrity and transparency of financial reporting [10]. The incorporation of predictive capabilities in financial accounting reduces dependency on intuition and allows data-driven strategies to flourish.

However, these opportunities are accompanied by formidable challenges. One of the most critical concerns is data security and privacy. As AI systems require access to vast amounts of sensitive financial data, the risk of unauthorized access, data breaches, and cyberattacks increases significantly [11, 12]. This is particularly concerning in jurisdictions like Iran, where data protection laws may not be fully harmonized with global cybersecurity standards. Furthermore, the ethical dimension of AI in accounting cannot be overlooked. The automation of ethical decision-making processes in auditing, for instance, risks bypassing the nuanced human judgment required in evaluating the context and intent of financial actions [13, 14].

Another challenge lies in the displacement of labor. As AI takes over tasks traditionally performed by human accountants, concerns about job security and deskilling emerge [15, 16]. While AI is unlikely to completely replace accountants, it does redefine their roles, necessitating new skills in data analytics, AI literacy, and digital ethics. The accounting profession, therefore, faces a dual challenge: integrating AI capabilities while upskilling the workforce to adapt to these technological changes [12, 17]. Educational institutions and professional associations must collaborate to revise accounting curricula and offer continuous professional development programs that equip accountants with the competencies required in an AI-driven environment [18].

Moreover, the practical implementation of AI systems often requires significant financial investment, which can be a barrier for small and medium-sized accounting firms [19]. These firms may lack the capital or technical expertise to adopt and maintain AI technologies, resulting in a digital divide within the profession. In the Iranian context, such disparities can exacerbate existing gaps in service quality and efficiency between well-resourced and under-resourced firms [17, 20]. Additionally, regulatory ambiguity around AI in accounting further complicates its adoption. As AI technologies outpace legal frameworks, accounting firms must navigate a landscape of uncertainty regarding liability, accountability, and professional standards [13, 21].

From a global perspective, AI's implications in accounting are being actively explored through bibliometric and literature reviews that track trends, innovations, and implementation outcomes [1, 18]. These studies reveal a

growing consensus on the inevitability of AI adoption, coupled with a cautious approach to its ethical and technical risks. The emergence of chatbot technologies such as ChatGPT has further accelerated discourse around AI's utility in real-time financial assistance and auditing support, but also heightened scrutiny regarding reliability and misuse [20, 22].

In the Iranian landscape, empirical evidence on AI adoption in accounting is still emerging. Yet, scholars and practitioners acknowledge the transformative potential of AI in addressing inefficiencies and elevating financial standards [6, 19]. Recent academic efforts underscore the need for structured frameworks to assess the readiness of accounting firms in embracing AI and to identify sector-specific enablers and barriers [23]. These frameworks must be contextualized to accommodate cultural, economic, and institutional variables unique to Iran, where centralized regulations and state-owned enterprises play a dominant role in shaping accounting practices.

Furthermore, studies have pointed to the importance of developing AI systems that align with Islamic financial principles and local ethical codes, a dimension often underrepresented in mainstream AI research [4, 13]. Culturally sensitive AI applications in accounting are essential to ensuring their acceptance and legitimacy among stakeholders. This is particularly relevant in regions where religious and moral considerations are deeply intertwined with professional conduct.

The interdisciplinary nature of AI in accounting also necessitates collaborative innovation. Insights from computer science, finance, behavioral economics, and regulatory policy must converge to produce robust AI accounting systems that are not only efficient but also ethically sound and legally compliant [2, 7]. Policymakers must also play an active role in facilitating this integration through supportive infrastructure, investment incentives, and regulatory clarity [3, 15].

In summary, the integration of artificial intelligence into the accounting profession in Iran represents both a significant opportunity and a complex challenge. AI technologies offer the potential to streamline operations, enhance accuracy, and enable predictive financial analysis. At the same time, they introduce ethical dilemmas, data security risks, labor market disruptions, and regulatory uncertainties. A comprehensive understanding of these dual forces—opportunity and risk—is essential for policymakers, educators, and practitioners seeking to navigate the future of accounting in an AI-driven world. Drawing on global evidence and localized analysis, this study aims to contribute to the ongoing discourse by exploring how Iranian accounting professionals perceive, adopt, and adapt to artificial intelligence, and by proposing strategic pathways for its ethical and effective implementation.

2. Methodology

The present study is a mixed-methods research (qualitative–quantitative), in which thematic analysis was employed to analyze the qualitative data. For the thematic analysis, the study utilized the six-phase approach proposed by Braun and Clarke (2006).

The statistical population in the qualitative phase included experts from academic settings with doctoral or master's degrees and more than 10 years of professional experience. The sampling method in this phase was purposive, and the sample size was determined based on theoretical saturation, resulting in 13 participants. In the quantitative phase, the statistical population consisted of approximately 15,000 active employees in the accounting profession in Iran. Using random sampling and Morgan's sampling table, a sample size of 210 was determined. Ultimately, 200 complete and valid questionnaires were collected from the participants. These questionnaires included items on demographic characteristics and questions related to the research hypotheses.

Subsequently, the questionnaires were subjected to statistical analysis. Frequency tables and charts were used to provide a descriptive overview of demographic indicators and the research hypotheses. In the next stage, the research hypotheses were tested using inferential statistics to determine their acceptance or rejection based on the results obtained from the questionnaire responses.

In the descriptive statistics section, the study examined research variables such as mean, standard deviation, and variance. In the inferential statistics section, confirmatory factor analysis (CFA) was used to assess the validity of the questionnaire. To test the research hypotheses, structural equation modeling (SEM) was applied using the SmartPLS 3 software.

3. Findings and Results

The demographic data of the participants (N = 200) show that 56% were male (n = 112) and 44% were female (n = 88). Regarding educational attainment, 30% (n = 60) held a bachelor's degree or lower, 59.5% (n = 119) held a master's degree, and 10.5% (n = 21) had a doctorate or higher. In terms of work experience, 25.5% (n = 51) had less than 5 years of experience, 46% (n = 92) had between 5 and 10 years, 19.5% (n = 39) had between 10 and 15 years, and 9% (n = 18) had more than 15 years of experience.

To determine the appropriate statistical test for the research hypotheses, the normality of the data related to each hypothesis was first examined using the Kolmogorov–Smirnov test. The research hypotheses and the corresponding test results are presented in the following tables:

Table 1. Results of Kolmogorov–Smirnov Test for the Variable "Opportunities"

Variable	Component	Z Statistic	Significance Level (p)
Opportunities	Smart Accounting	1.565	0.000
	Cost Management	1.563	0.010
	Reduction of Human Error	2.058	0.000
	Online Auditing	1.754	0.002
Challenges	Data Insecurity	1.757	0.015
	Fraud Increase	1.623	0.015
	Policy Non-Compliance	1.058	0.000
	Uncertainty	1.754	0.004

The test statistics for the research variables at a 5% error level were less than the critical value. Therefore, the null hypothesis of data normality is rejected, confirming non-normality. Based on this, nonparametric tests and SmartPLS version 3 software were applied for further analysis.

Before hypothesis testing, the validity and reliability of the structural equation models were assessed.

According to Table 1, Cronbach's alpha values for all variables exceed 0.70, indicating acceptable internal consistency.

Table 2. Cronbach's Alpha Values

Variable	Cronbach's Alpha
Smart Accounting	0.894
Cost Management	0.897
Reduction of Human Error	0.854
Online Auditing	0.871
Data Insecurity	0.855
Fraud Increase	0.841
Policy Non-Compliance	0.802

Uncertainty	0.812

Composite reliability is considered a better metric than Cronbach's alpha in SEM. As shown in Table 3, all CR values exceed 0.70, confirming acceptable model fit for the measurement constructs.

Table 3. Composite Reliability Values

Variable	Composite Reliability
Smart Accounting	0.852
Cost Management	0.762
Reduction of Human Error	0.811
Online Auditing	0.745
Data Insecurity	0.702
Fraud Increase	0.843
Policy Non-Compliance	0.827
Uncertainty	0.862

Convergent validity is the second metric used to evaluate measurement model fit in PLS. If the Average Variance Extracted (AVE) exceeds 0.50, convergent validity is deemed acceptable. As shown in Table 4, all AVE values are above 0.50, confirming satisfactory convergent validity for the model.

Table 4. Average Variance Extracted (AVE)

Variable	AVE
Smart Accounting	0.545
Cost Management	0.547
Reduction of Human Error	0.502
Online Auditing	0.512
Data Insecurity	0.565
Fraud Increase	0.554
Policy Non-Compliance	0.592
Uncertainty	0.536

Discriminant validity is the third criterion for evaluating the fit of measurement models in PLS. It can be assessed using: (a) cross-loadings, and (b) the Fornell–Larcker criterion. This study employed the Fornell–Larcker method, which asserts that discriminant validity is acceptable when the AVE of each construct exceeds the squared correlations between that construct and others.

Table 5. Discriminant Validity Matrix (Fornell–Larcker Criterion)

Variable	1	2	3	4	5	6	7	8
1. Smart Accounting	0.738							
2. Cost Management	0.714	0.739						
3. Human Error Reduction	0.715	0.626	0.708					
4. Online Auditing	0.701	0.623	0.665	0.715				
5. Data Insecurity	0.722	0.525	0.580	0.711	0.751			
6. Fraud Increase	0.715	0.511	0.669	0.710	0.715	0.724		
7. Policy Non-Compliance	0.626	0.414	0.698	0.552	0.626	0.454	0.751	
8. Uncertainty	0.655	0.454	0.412	0.532	0.655	0.252	0.528	0.755

Source: Researcher's findings

Figure 1 illustrates the factor loadings. Given that the factor loadings exceed the threshold of 0.40, the indicators meet the required criteria.

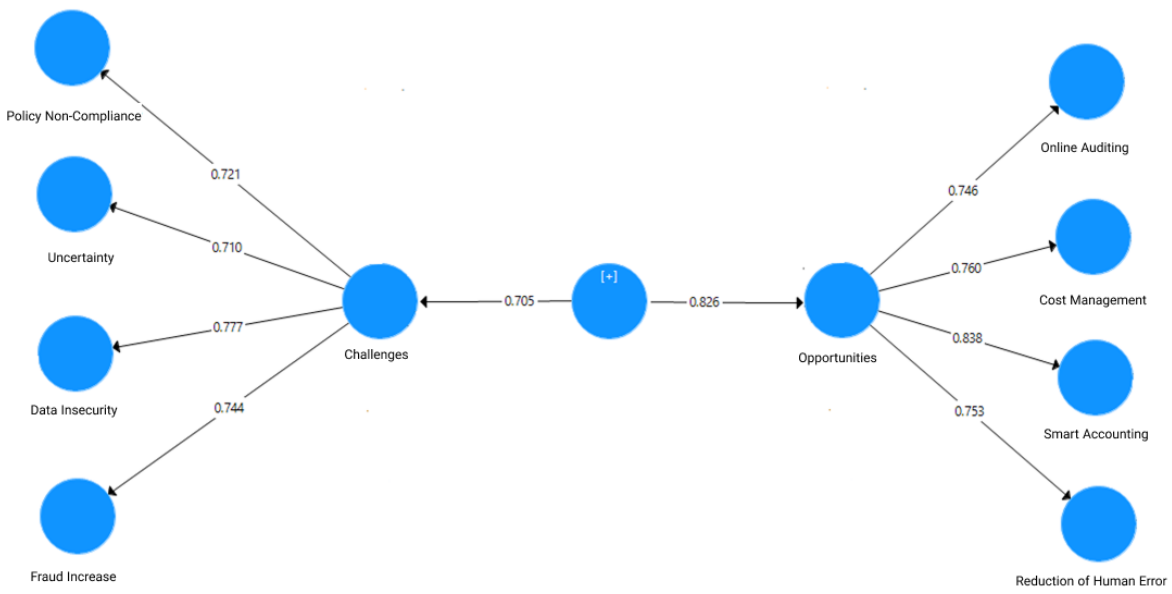

Figure 1. Structural Model – Factor Loadings and Significance Coefficients

The primary criterion for assessing the relationships between constructs in the structural model is the t-value. If t-values exceed 1.96, the relationship is considered statistically significant at the 95% confidence level. However, it is important to note that t-values indicate significance but not the strength of the relationship. As shown in Figure 2, the path coefficients between variables exceed 1.96, confirming the significance of the paths and the adequacy of the structural model.

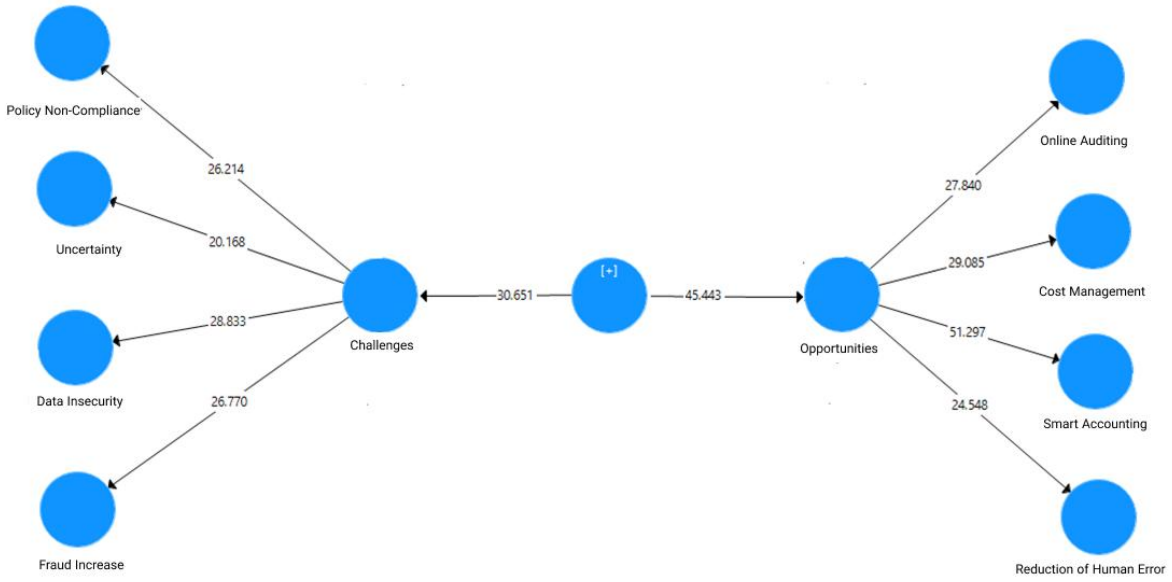

Figure 2. Structural Model – t-Statistics

The second criterion for assessing structural model fit is the R^2 value of the endogenous latent variables. R^2 reflects the proportion of variance explained by exogenous variables. As shown in Table 6, the R^2 values indicate a good model fit.

Table 6. R^2 Values

Variable	R^2 Value
Smart Accounting	0.521
Cost Management	0.504
Reduction of Human Error	0.604
Online Auditing	0.553
Data Insecurity	0.573
Fraud Increase	0.555
Policy Non-Compliance	0.543
Uncertainty	0.571

Friedman's test was used to prioritize the dimensions of AI-related opportunities and challenges in the accounting profession. According to the tables below, and given the significance values (Sig = 0.00) at the 5% level, the null hypothesis of equal mean ranks is rejected.

Table 7. Friedman Test Results – Prioritization of AI Opportunity Dimensions

Variable	Mean Rank
Online Auditing	5.83
Human Error Reduction	5.72
Cost Management	5.87
Smart Accounting	6.27
$\chi^2 = 95.586$, df = 9, Sig = 0.000	

Table 8. Friedman Test Results – Prioritization of AI Challenge Dimensions

Variable	Mean Rank
Uncertainty	2.32
Fraud Increase	2.54
Data Insecurity	2.57
Policy Non-Compliance	2.36
$\chi^2 = 13.847$, df = 3, Sig = 0.000	

4. Discussion and Conclusion

The present study aimed to investigate the challenges and opportunities of artificial intelligence (AI) in the accounting profession in Iran using a mixed-method approach. The results of the Kolmogorov–Smirnov test confirmed the non-normality of the data, justifying the use of nonparametric tests and structural equation modeling (SEM) through SmartPLS. The findings demonstrated that AI offers a variety of strategic opportunities in the accounting profession, including smart accounting, cost management, reduction of human error, and online auditing. Among these, smart accounting received the highest rank in the Friedman test, indicating its perceived importance by respondents. Conversely, key challenges identified included data insecurity, increased fraud, failure in policy implementation, and uncertainty—with data insecurity emerging as the most critical challenge.

The prominence of smart accounting as the most important opportunity aligns with the global trend of AI integration in accounting practices, where intelligent systems automate routine tasks, reduce human dependency, and enhance the accuracy of financial data processing [5, 6]. This finding is consistent with prior literature emphasizing AI's capability to enhance operational efficiency and allow accountants to shift their roles from transactional data processors to strategic financial advisors [2, 4]. AI-powered platforms facilitate real-time financial monitoring and adaptive modeling, which are crucial for dynamic financial environments. The study's results also

support the notion that AI enables greater analytical depth, predictive insight, and compliance assurance, all of which contribute to a more transparent and agile accounting ecosystem [9, 12].

Cost management was another highly ranked opportunity in the study, indicating the importance of AI-driven tools in identifying inefficiencies, optimizing resources, and offering predictive budgeting functionalities. This finding mirrors previous works that emphasize AI's role in enhancing financial planning and reducing overhead through algorithmic processing of financial patterns [7, 10]. Additionally, the reduction of human error was also viewed as a crucial benefit of AI adoption, particularly in eliminating manual mistakes in data entry, calculation, and report generation. Such improvements not only increase the reliability of financial reports but also reduce the time and cost associated with audit revisions and reconciliations [18, 20].

The prioritization of online auditing as a significant opportunity reflects the growing need for continuous monitoring and remote auditing systems, particularly in a post-pandemic context. AI facilitates such capabilities through intelligent anomaly detection, real-time transaction verification, and adaptive compliance mechanisms [17, 23]. These systems improve the scope and speed of audits while minimizing the risk of oversight. The shift toward digital audit platforms is further accelerated by the increasing reliance on cloud-based accounting software, supported by AI for audit trail management and predictive fraud analytics [3, 11].

On the challenges front, data insecurity emerged as the most critical concern among respondents. This aligns with prior studies emphasizing that AI systems are highly data-dependent and often require access to large volumes of sensitive financial information [15, 21]. Inadequate data governance, poor encryption standards, and lack of robust cybersecurity frameworks make financial institutions vulnerable to breaches and unauthorized access. This concern is especially acute in developing economies like Iran, where the digital infrastructure may not yet fully support the cybersecurity demands of AI-integrated systems.

The finding that AI could potentially increase fraud might appear paradoxical, given AI’s reputation for improving fraud detection. However, this concern reflects a broader apprehension: while AI can detect fraud, it can also be exploited by sophisticated users to perpetrate fraud through algorithm manipulation or synthetic data creation [13, 16]. These dual-use characteristics of AI necessitate strict control mechanisms, continuous monitoring, and ethical oversight to prevent misuse. It also suggests a growing need for training and ethical guidelines to ensure that accountants understand not only the functionality but also the vulnerabilities of AI systems.

The challenge of policy non-compliance points to the incompatibility between AI systems and traditional regulatory frameworks. Many Iranian accounting firms operate under static compliance policies that may not be adequately responsive to the dynamic logic of AI algorithms. This misalignment contributes to inefficiencies in AI deployment and undermines the potential of these technologies [12, 13]. Furthermore, uncertainty regarding legal responsibility, algorithm transparency, and decision accountability exacerbates the hesitation in AI adoption. Such uncertainty aligns with the concerns raised in global studies about the lack of clear regulations governing AI implementation in the accounting and auditing fields [14, 22].

The ranking of uncertainty as a major challenge also resonates with earlier findings that highlight the unpredictability of AI systems, especially when they operate with deep learning models that are opaque and difficult to audit themselves [1, 8]. This “black box” nature of AI creates hesitancy among accounting professionals who are bound by standards of accountability, traceability, and compliance. When AI decisions lack explainability, the integrity of the financial decision-making process may be called into question.

Overall, the study confirms the dual-edged nature of AI in accounting: while it presents enormous opportunities to increase efficiency, reduce costs, and improve accuracy, it simultaneously introduces challenges related to ethics,

security, and professional identity. These findings are consistent with global literature calling for a balanced and phased approach to AI adoption—one that maximizes benefits while mitigating risks through ethical guidelines, skill development, and policy reform [7, 12, 18].

This study, while comprehensive in scope, is not without limitations. Firstly, the research focused exclusively on the Iranian context, which may limit the generalizability of the findings to other economies with different regulatory, technological, or institutional environments. Secondly, the sample size, though statistically adequate, was constrained by access to respondents and limited to professionals currently active in the accounting sector, potentially overlooking the views of academics, regulators, and technology developers. Thirdly, the rapidly evolving nature of AI technologies means that some of the perceptions captured in this study may become outdated as new developments emerge. Finally, while the use of mixed methods added depth to the analysis, the absence of longitudinal data restricted the ability to track changes over time in attitudes toward AI adoption.

Future studies could explore comparative analyses across countries with varying levels of technological readiness and regulatory maturity to assess how national contexts shape AI adoption in accounting. Longitudinal research could also be conducted to examine how attitudes and implementation outcomes evolve as AI systems become more integrated into accounting workflows. Another promising avenue would be to investigate the role of professional education and certification programs in preparing accountants for AI-related challenges. Furthermore, future work could include qualitative interviews with regulators and policymakers to understand institutional barriers and enablers for ethical AI governance in the accounting profession.

To ensure effective integration of AI in accounting, firms must invest in workforce upskilling, focusing on data literacy, AI ethics, and digital tools. Accounting associations should update certification frameworks to include competencies in AI and data analytics. Organizations must also implement robust data governance policies and collaborate with IT departments to secure sensitive financial information. Finally, a phased and cautious adoption strategy should be employed, starting with low-risk applications of AI and gradually expanding to more complex functions, ensuring ethical oversight and compliance at every step.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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