



The Impact of Artificial Intelligence Applications on the Quality of Accounting Information (A Field Study on the Offices of Chartered Accountants in Sana'a Capital)

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Abstract

This research aims to investigate the impact of Artificial Intelligence Applications (AIA), with its dimensions—expert systems, neural networks, genetic algorithms, and intelligent agents—on the quality of accounting information. The research methodology employed a mixed-method approach, combining both quantitative and qualitative techniques. A survey was conducted among accounting and auditing professionals to collect data on the adoption of AI applications and their perceived impact on the quality of accounting information. Statistical analysis methods, including correlation and regression analysis, were applied to examine the relationships between the adoption of AI applications and the targeted outcomes. The study yielded several findings, most notably that the use of genetic algorithms represents one of the most significant and influential applications of artificial intelligence in enhancing the quality of accounting information. The results indicated no statistically significant effect of expert systems, neural networks, or intelligent agents on the quality of accounting information. However, the genetic algorithms dimension had a positive and significant impact. This may be attributed to the professional and technological environment in Yemen, which has not yet reached the maturity required to effectively leverage more complex AI technologies, such as expert systems, neural networks, and intelligent agents. In contrast, the environment has helped, at least partially, with more practical and effective analytical tools such as genetic algorithms, as reflected in the study's findings. The study concludes with several recommendations, most importantly the need to adopt training programs and workshops for chartered accountants to enhance their understanding and application of artificial intelligence technologies.

Keywords: Artificial Intelligence Applications, Accounting Information Quality

ملخص: يهدف هذا البحث إلى دراسة أثر تطبيقات الذكاء الاصطناعي بأبعاده (النظم الخبيرة، الشبكات العصبية، الخوارزميات الجينية، الوكلاء الأذكاء) على جودة المعلومات المحاسبية، وقد تم استخدام المنهج المختلط والذي جمع بين الأساليب الكمية والنوعية، وتم تطوير استبانة وزعت على مكاتب المحاسبين القانونيين لجمع البيانات حول تبني تطبيق الذكاء الاصطناعي وأثره على جودة المعلومات المحاسبية، ولغرض تحليل البيانات تم استخدام الأساليب الإحصائية المتمثلة في التكرار والنسبة المئوية والمتوسطات الحسابية والانحرافات المعيارية، كما تم استخدام تحليل الانحدار الخطي المتعدد وتحليل الارتباط على بيانات الاستبيان لتحديد الأثر بين تطبيق تقنيات الذكاء الاصطناعي وجودة المعلومات المحاسبية. وقد توصلت الدراسة إلى العديد من النتائج كان من أهمها، ان الخوارزميات الجينية يمثل أحد اهم تطبيقات الذكاء الاصطناعي واكثرها تأثيرا على جودة المعلومات المحاسبية. كما اظهرت نتائج الدراسة عدم وجود أثر ذو دلالة إحصائية للأنظمة الخبيرة، الشبكات العصبية، الوكلاء الأذكاء) على جودة المعلومات المحاسبية، ويعتبر تطبيق الخوارزميات الجينية من أكثر تطبيقات الذكاء الاصطناعي أهمية وتأثيراً على جودة المعلومات المحاسبية. ويعزى ذلك حسب تقديرنا، إلى أن البيئة المهنية التكنولوجية لم تصل إلى مستوى النضج المطلوب للاستفادة الفعالة من بعض تقنيات الذكاء الاصطناعي التي تتطلب مهارات مادية وتكنولوجية أكثر تعقيداً كالأنظمة الخبيرة والشبكات العصبية والوكلاء الأذكاء. وبالمقابل، استفادت البيئة المهنية اليمنية ولو جزئياً من أدوات تحليلية أكثر استخداماً وابتسائها كالخوارزميات الجينية، وهو ما انعكس بوضوح في نتائج الدراسة. وقد خلصت الدراسة إلى العديد من التوصيات كان أهمها ضرورة اعتماد برامج تدريبية وورش عمل للمحاسبين القانونيين لتعزيز مهاراتهم ومعرفتهم بتطبيقات الذكاء الاصطناعي في مجال المحاسبة والمراجعة.

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1. Introduction

The world today is witnessing a rapid race in the development of information technology, which has become the backbone of life across various fields. Among the most prominent forms of this technology is artificial intelligence (AI), widely used by institutions and companies to develop systems and manage data and information characterized by high credibility and accuracy.

AI aims to simulate human behavior in performing tasks across different domains, including accounting, where it plays a vital role in delivering precise, clear, and highly reliable information in a short period. This contributes to generating error-free and unbiased accounting reports that assist investors, lenders, and other stakeholders in making sound financial decisions.

The current reality reflects the power of AI applications in reshaping task execution, offering innovative tools to enhance productivity, and transitioning operations from paper-based to digital systems. Integrating AI into accounting systems presents both significant opportunities and notable challenges. AI technologies provide unique capabilities that enhance workflows and contribute to the development of improved products and services (Benbya et al., 2021; Engel et al., 2021). These advancements lead to increased operational efficiency and value creation in accounting and financial management.

Furthermore, AI significantly enhances financial risk management by enabling faster data processing, comprehensive analysis, and reduced human error, thereby strengthening risk mitigation (Zhao, 2022). It also assists financial planners in addressing behavioral biases and improving the quality of decisions (Hasan et al., 2023). AI's adaptability to dynamic environments has proven to improve organizational performance, particularly in capital allocation and financial planning processes (Wang, 2022).

1.1 Research Problem and Questions

AI has played a pivotal role in enhancing financial decision-support systems (Jia et al., 2022). Its adoption has expedited the shift from traditional financial accounting to management accounting, improving information quality and minimizing repetitive tasks (Li et al., 2022). By integrating advanced software tools, the processes of data entry and information transmission have become faster, more accurate, and less costly.

In this context, AI emerges as a central pillar of digital transformation, particularly in accounting institutions. It represents not only a technological advancement but also a structural shift in business models through the adoption of advanced tools to manage processes, suppliers, customers, and stakeholders.

Chukwudi et al. (2018) found that AI adoption positively affects the performance of accounting firms, recommending continuous development in this field for improved performance and cost reduction.

Based on this context, the research problem focuses on examining the extent to which AI applications influence the quality of accounting information.

Main Research Question

Is there a statistically significant impact of using artificial intelligence applications (expert systems, neural networks, genetic algorithms, intelligent agents) on the quality of accounting information?

Sub-questions

Is There a statistically significant impact of using artificial intelligence applications (Expert systems, neural networks, genetic algorithms, intelligent agents) On the quality of accounting information?

From this main question, the following sub-questions are derived:

- 1. Is there a statistically significant impact of expert systems on the quality of accounting information?*
- 2. Is there a statistically significant impact of neural networks on the quality of accounting information?*

3. Is there a statistically significant impact of genetic algorithms on the quality of accounting information?

4. Is there a statistically significant impact of intelligent agents on the quality of accounting information?

1.2 Research Objectives

This study aims to investigate the impact of Artificial Intelligence Applications (AIA) on the quality of accounting information.

Sub-objectives:

1. To identify the impact of expert systems on the quality of accounting information.
2. To identify the impact of neural networks on the quality of accounting information.
3. To identify the impact of genetic algorithms on the quality of accounting information.
4. To identify the impact of intelligent agents on the quality of accounting information.

1.3 Research Hypotheses

Al-Shatnawi et al. (2019) identified a significant relationship between AI application and the quality of accounting information, confirming a statistically significant impact of AI technologies on the relevance and timeliness of accounting information in Jordanian public shareholding companies. Similarly, Ladhma et al. (2019) demonstrated that tools such as expert systems and neural networks influence business performance and emphasized the importance of equipping accounting graduates with AI skills.

Main Hypothesis (H0): There is no statistically significant impact at the ($\alpha \leq 0.05$) significance level of using artificial intelligence applications (expert systems, neural networks, genetic algorithms, intelligent agents) on the quality of accounting information.

Sub-Hypotheses:

- **H0.1:** There is no statistically significant impact of expert systems on the quality of accounting information.
- **H0.2:** There is no statistically significant impact of neural networks on the quality of accounting information.
- **H0.3:** There is no statistically significant impact of genetic algorithms on the quality of accounting information.
- **H0.4:** There is no statistically significant impact of intelligent agents on the quality of accounting information.

2. Literature Review

2.1 Artificial Intelligence Applications

Artificial Intelligence (AI) is a technical science that simulates human intelligence to develop theories, methods, technologies, and application systems. In short, it refers to computer systems capable of transforming human knowledge into productive work through technology. By applying AI methods, users can significantly enhance traditional information transmission processes by increasing speed, reducing costs, and overcoming communication bottlenecks (AI Topics, 2016).

Hybrid systems combine multiple AI technologies, leveraging their respective strengths. These systems integrate expert systems with neural networks or other techniques to optimize decision-making by utilizing known control-variable relationships and identifying complex patterns that are not easily captured by rule-based systems.

Overall, the application of AI in accounting and auditing offers opportunities to improve efficiency, accuracy, and risk management. Al-Sayyed et al. (2021) emphasized the growing importance of AI technologies—such as expert systems and neural networks—in shaping the future of accounting and auditing practices. Their study examined the effect of these technologies on audit evidence from the

perspective of auditors, concluding that expert systems had a measurable impact, while neural networks did not show a significant effect in that context.

These findings have generated greater interest among auditing firms in adopting AI tools to enhance audit quality. Hassani (2023) explored the dimensions of artificial intelligence and its associated components to assess their impact on improving the quality of accounting information. This was done by evaluating the efficiency and effectiveness of electronic accounting disclosure. The findings revealed a statistically significant relationship between AI techniques and key variables that influence the enhancement of accounting information quality. Similarly, Razia et al. (2024) stressed that the application of artificial intelligence and its various dimensions plays a vital role in fostering innovation and strengthening competitive advantage. There are many AI applications across various domains, each tailored to serve specific purposes. This study focuses on four prominent AI applications:

2.1.1 Expert Systems (ES)

One of the most widely used AI applications in accounting is expert systems. These systems assist management in making well-informed decisions and solving complex problems, especially in high-risk environments. Expert systems enhance the quality of accounting data by reducing error rates and accelerating the identification and resolution of malfunctions. These capabilities improve management efficiency, boost productivity, and optimize outputs.

In financial accounting, expert systems are used in the design of accounting information systems, financial statement processing, invoice management, adherence to accounting standards, and worksheet preparation. In cost and management accounting, they are applied in inventory control, cost and variance analysis, management control system diagnostics, investment decisions, and more.

Expert systems support human experts by generating multiple recommendations to facilitate optimal decision-making. Structurally, expert systems are composed of five main components (Khawalid, 2019). Essentially, an expert system models the knowledge of a human expert, stores it in a knowledge base, and applies it within an information system designed for a specific field of expertise. The system can then replace the human expert in solving complex problems and guiding decision-makers (Al-Zahraa & Fathi, 2017).

2.1.2 Neural Networks (NN)

Neural Networks (NN) are AI technologies inspired by the structure and functionality of the human brain. They consist of interconnected nodes—called artificial neurons or units—organized into layers. These networks are capable of learning from data, recognizing patterns, and making decisions or predictions based on acquired knowledge.

A neural network is essentially a large-scale parallel processing system composed of simple processing units. These units, also known as neurons or nodes, possess neural properties that allow them to store practical knowledge and experimental information. The network uses these capabilities to make data-driven decisions by adjusting connection weights between neurons (Ezzedine et al., 2009).

2.1.3 Genetic Algorithms (GA)

Genetic Algorithms (GAs) are a class of AI techniques inspired by the process of natural selection and genetic evolution. These algorithms are used to solve complex problems by generating, evaluating, and evolving a population of candidate solutions based on a fitness function.

In the field of accounting, genetic algorithms are employed to enhance decision-making processes by identifying optimal solutions in scenarios that involve large volumes of data, uncertainty, and numerous variables. GAs can optimize budgeting processes, financial planning, cost control, and resource allocation by simulating various scenarios and selecting the best alternatives.

Genetic algorithms function through a cycle of selection, crossover (recombination), and mutation. This evolutionary approach allows the system to iteratively improve upon previous generations of solutions, making it particularly effective in handling accounting and financial problems that do not have straightforward analytical solutions. Their ability to adapt to dynamic environments gives

them a strategic advantage in modern accounting systems, especially where predictive analytics and forecasting are required.

2.1.4 Intelligent Agents (IA)

Intelligent Agents are autonomous entities capable of observing their environment, processing information, and performing actions to achieve specific objectives. In accounting, intelligent agents can operate independently or collaboratively with other systems to carry out repetitive or rule-based tasks such as monitoring transactions, detecting fraud, and maintaining compliance with accounting standards.

These agents are designed to perceive changes in their environment, interpret data, and act upon it without human intervention. For instance, an intelligent agent in an enterprise resource planning (ERP) system might continuously monitor financial transactions, flag anomalies in real-time, or generate alerts for irregular patterns.

Intelligent agents are also applied in managing financial portfolios, performing automatic reconciliations, and facilitating continuous auditing. Their adaptive capabilities allow them to respond to changes in input data and operational rules, making them suitable for dynamic accounting environments. Moreover, intelligent agents contribute to improving the timeliness and accuracy of financial reporting by reducing manual workload and the likelihood of human error.

The integration of intelligent agents with other AI tools (such as machine learning algorithms and natural language processing) further enhances their effectiveness, making them a key component of intelligent accounting systems.

3. Quality of accounting information

International Financial Reporting Standards (IFRS) define high-quality information as equitable, relevant, understandable, practical, clear, and transparent. The provided financial information must consistently measure an entity's monetary situation, financial condition, revenue, and variations in its value, which may result in information reliability (Aifuwa and Embele 2019). However, the deficit in corporate governance may undermine the quality of prepared financial information.

Several characteristics, such as verifiability, comparability, timeliness, and understandability, are the most important qualitative characteristics of financial reports. These characteristics stress the provision of transparent and reliable data for their users rather than misleading information (Gajevszky 2015). For instance, the usefulness and materiality of financial information are two underlying features of relevant information since useful reports benefit decision-makers (Cheung et al. 2010), and they refer to an entity's fair value (Beest et al. 2009).

Other qualitative features include the reliability of financial reports that are obtainable by verifiability, faithfulness, and the neutrality of the prepared information (Cheung et al. 2010). The quality of accounting information is a standard by which the extent to which the information can be achieved, can be judged by accounting for its objectives, for accounting information to be useful to decision-makers, it must strike an appropriate balance in the level of detail provided. The quality of accounting information is necessary to have the criterion of usefulness, meaning the ability of the information to meet the needs of a specific decision. The concept of quality of accounting information also refers to the quality of information Credibility and must be free from distortion, error, and misleading. High-quality accounting information plays a crucial role in guiding informed investment decisions by enabling accurate risk assessment, valuation analysis, and strategic investment planning while fostering investor confidence in financial markets (Diantaris, 2024). This quality information allows investors to assess investment opportunities more accurately by providing a clear picture of a company's financial health, performance, and prospects. Two key indicators of accounting information quality are the reliability of the accounting data presented in financial reports and the usefulness of this data to end users. Additionally, quality is influenced by the degree to which the information adheres to established accounting standards and guidelines and faithfully represents the organization's financial position, including the relative importance of recorded events (Awwad et El Houry, 2024; Awwad et Alkababji, 2021).

3.1. Explaining the Relationship between Technological Advancements and the Quality of Accounting Information

The quality of accounting information depends on the integrity of the accounting information system related to business areas. Integrated business programs, such as IT programs, help create added business value (Sařcer 2013). As a result, the reported information will be integrated, reliable, timely, and accurate. Collecting accounting data using IT often reduces the cost of producing accounting information. Furthermore, it increases the reliability of accounting information, saving time and expenses (Elsharif 2019).

Technological advancements over the past few decades have greatly increased the competitive nature of the business world. Companies may use software, hardware, and the internet to transform their businesses from being local and traditional organizations to competing in global markets. Many of these companies have responded to these changes by automating their business processes, gathering industry-related information, and using it to their advantage. Computers have changed the nature of accounting and turned it into a fast-paced and dynamic profession. The change in accounting technology began with simple spreadsheet programs that upgraded companies from manually calculated spreadsheets. Because of these automated programs, accountants have more time to interpret data, provide sound financial advice, suggest smarter business decisions, and contribute more to their client's businesses. Accountants are now expected to recommend best practices to management and suggest ways to reduce costs while improving profits. Information is described as a form of data that is processed specifically organized and structured in data applications, which enhances the quality and reliability of data in listed and non-listed companies, resulting in increased comprehensibility and the guarantee of reducing uncertainty (Surbhi 2018).

3.2 Characteristics of the quality of accounting information

3.2.1. Basic characteristics

- **Suitability**

Information that is capable of causing a change in the direction of a decision, by increasing its influence in controlling the present and understanding the past in order to predict the future objectively, which facilitates the process of making and taking a more accurate decision for the users (FASB).

- **Honest representation**

According to this characteristic, financial information, events, operations, and economic phenomena are visualized reliably, as they are prepared and represented honestly and truthfully. This is achieved by the information having the qualities of free error, neutral, and complete, each of which means the following: Error-free, means, there is no error or omission in the description. Neutrality means that the information is not biased towards one party at the expense of another party, that is, the information is prepared for public use without bias or change in it. Complete means that the financial information expresses all the information that the user needs in order to understand, including Descriptive and explanatory information. (Al-Ghazawi,2021)

3.2.2. Supporting characteristics (enhancing)

- **Verifiability**

It is one of the forms of characteristics that support the quality of accounting information, which means the degree of agreement between independent and knowledgeable individuals who carry out the measurement process using the same measurement methods, that is, the extent to which there is a high degree of consensus among independent accountants when they use the same measurement methods and produce results similar to economic events so that they achieve the characteristic of honest representation. (Abu Nassar et Hamidat.,2020).

- **Understandability**

This characteristic requires that the available financial information be directly understandable by its users. Therefore, users of financial information are supposed to have a degree of knowledge and awareness that enables them to understand this information and evaluate its level of usefulness.

- **Comparability**

It expresses the possibility of comparing the financial statements for a specific period of time with financial statements for previous periods of the same facility or comparing the financial statements of a company with another facility for the same period. The goal of the comparison process is to enable the information user to make decisions related to investment and financing decisions and also to track the performance of The facility.

- **Timing**

that appropriate information is information that is available at the right time, even if that is at the expense of confidence in the measurement process or the extent of certainty of the validity of the resulting measurements (Al-Fadagh,2002), and this characteristic also means the availability of information at a time when it has a significant impact on the decision-making process, due to the speed with which information loses its value in the world of trade, where past information becomes unhelpful for decision-making.

It is important to note that the quality of data in accounting and financial systems does not rely solely on the inherent or subjective characteristics of the information itself. Rather, it also depends on factors related to the decision-makers and their interpretation and application of the information (Nmdele & Krosh, 2021). Ensuring high-quality accounting information is a fundamental objective for many organizations. However, it is influenced by various components that form part of the financial accounting system and are essential for achieving its goals. As identified by Qarwani et al. (2015), these components include:

- Material components: These refer to the physical tools and equipment used in generating accounting information.
- Human components: This includes the personnel who operate and manage the accounting system.
- Accounting components: These encompass the financial resources and assets available to the system, which enable it to function effectively.
- Data list: This consists of the structured procedures and required datasets essential for operating the system and fulfilling its objectives.

3.3. Challenges in Assessing Accounting Information Quality

The challenges in assessing and ensuring accounting information quality, as identified in the literature, pose significant hurdles for investors and regulators alike. Earnings management, a common issue discussed in studies such as those by Huang et al., (2021) and Zimon et al., (2021), refers to the manipulation of financial statements to portray a more favorable financial position than reality. This practice can distort the accuracy and reliability of accounting information, leading to misinformed investor decisions and reduced market transparency.

Disclosure practices also contribute to challenges in assessing accounting information quality. Studies by Pombinho et al., (2024) and Binh & Lee (2024) highlight the variability and complexity of disclosure practices among companies, which can affect the comparability and consistency of financial information across firms. Inconsistent disclosure practices make it difficult for investors to perform meaningful analyses and evaluations, hindering their ability to make informed investment decisions. Furthermore, the complexity of financial statements, as discussed in research by Morais & Pinto (2023), presents challenges for investors in understanding and interpreting accounting information accurately. Financial statements often contain technical language, complex accounting principles, and intricate financial instruments, making it challenging non-expert investors to assess the quality and reliability of the information presented.

4. Impact of Artificial Intelligence on the Quality of Accounting Information

Artificial Intelligence (AI) can and should be leveraged to enhance business processes and operations, ultimately leading to improved investment decisions as well as greater value and quality in business performance. The integration of AI in accounting is not intended to replace the accounting and auditing workforce, but rather to support and augment their capabilities. By automating time-consuming and repetitive tasks, AI helps professionals focus on higher-value activities while ensuring greater accuracy, reliability, and reduced risk in their work. AI also plays a

critical role in advancing business operations through the digitalization of workflows, reducing operational costs, and boosting organizational efficiency and effectiveness.

To enhance the utility of accounting information and its relevance, the discipline has been continuously updated, including the integration of artificial intelligence (AI) technologies. This integration has established a significant relationship between AI and accounting information contributing to the improvement of accounting systems and the quality of the data they produce.

Empirical studies indicate that AI applications have improved operational efficiency, reduced errors, and enhanced effectiveness across various sectors (Kindzeka, 2023). Specifically, AI has contributed to better non-financial performance in manufacturing organizations and improved the effectiveness of accounting information systems (Hashem & Alqatamin, 2021). On a broader economic scale, AI has been instrumental in fostering high-quality economic growth and development (L. Hu et al., 2021). In education, AI has enabled enhanced efficiency in learning processes, promoted global access to education, and facilitated personalized learning experiences (Lijia Chen et al., 2020, El-Shantawy et al., 2019). there is a positive impact of artificial intelligence represented by its techniques (machine learning, deep learning, neural network, expert systems, Internet of Things) on the quality of financial reports and decision makers (Alia, 2023).

Chukwuani and Egiyi (2020) conducted a study to assess the impact of AI on the accounting industry by illustrating the level of technological advancement through the automation of various accounting and auditing procedures. The researchers underscored the evolving role of accountants in an increasingly automated environment and explored how they can leverage modern technologies to drive business improvement. Their findings indicated that the application of AI in accounting functions positively influences business performance. Furthermore, they suggested that AI contributes to reducing instances of fraud and enhances the quality and reliability of financial information provided by organizations. Moreover, the growing adoption of AI in accounting has spurred the development of innovative educational and training programs in academic institutions, aimed at equipping future accountants with essential AI competencies (Cai, 2022).

3. Research Methodology

3.1 Research Design and Approach

This study adopts a **descriptive and analytical** approach to investigate the impact of Artificial Intelligence Applications (AIA) on the quality of accounting information. A **mixed-method approach** was employed, integrating both **quantitative** and **qualitative** techniques to provide a comprehensive understanding of the subject matter.

Quantitative data were collected through a structured questionnaire administered to accounting and auditing professionals. Qualitative insights were obtained from open-ended responses and interviews with selected participants to complement and deepen the quantitative findings.

3.2 Population and Sample

The research population includes chartered accountants working in accounting and auditing offices within **Sana'a Capital**, Yemen. The sample was selected using a **simple random sampling method**, ensuring that each member of the population had an equal chance of selection. Frequencies and percentage of demographic variables were calculated, to explore the characteristics of the sample.

Table (1) shows Frequencies and percentages for each variable and the study tool represented by the questionnaire prepared to obtain the required

Table (1): Characteristics of the Study

variables		Frequencies	Percentage %
Gender	Male	53	96.4
	Females	2	3.6
Educational background	diploma	2	3.6
	Bachelor's	37	67.3
	Master's	6	10.9
	Ph.D	10	18.2
Years of service	less than5 years	14	25.5
	5-10 years	21	38.2
	10-15 years	7	12.7
	more than15 years	13	23.6

3.3 Data Collection Tool

The main tool for data collection was a **structured questionnaire**, consisting of two parts:

- **Part One:** Demographic information (e.g., age, educational qualification, years of experience, job title).
- **Part Two:** Statements measuring the impact of the four AI dimensions—expert systems, neural networks, genetic algorithms, and intelligent agents—on the quality of accounting information.

A **five-point Likert scale** was used for responses, ranging from:

- (1) Strongly disagree
- (2) Disagree
- (3) Neutral
- (4) Agree
- (5) Strongly agree

The questionnaire was reviewed by academic experts to ensure **validity**, and a **pilot study** was conducted to test **reliability** using **Cronbach's Alpha**, which yielded acceptable reliability coefficients for all dimensions.

Secondary data was collected from a variety of academic and scientific resources, including research papers, books, peer-reviewed journals, periodicals, articles, reports, and reputable websites related to artificial intelligence applications and the quality of accounting information. These sources were used to build a general conceptual framework for the field under investigation.

3.4 Data Analysis Techniques

The data collected were analyzed using **Statistical Package for the Social Sciences (SPSS)**. The following statistical techniques were applied:

- **Descriptive statistics** (mean, standard deviation, frequencies)
- **Reliability analysis** (Cronbach's Alpha)
- **Correlation analysis** to assess relationships between variables

- **Regression analysis** to test the impact of each AI dimension on the quality of accounting information. All hypotheses were tested at a **significance level of $\alpha \leq 0.05$** .

4. Empirical Study

4.1 Correlation Coefficient between the Dimensions of Artificial Intelligence Applications

To examine the relationships between the dimensions of Artificial Intelligence Applications, the Pearson correlation coefficient was utilized. This statistical method helps determine the strength and direction of the linear relationship between each pair of dimensions. The results of the correlation analysis are presented as follows:

Table (2): Correlation Coefficient

M	Dimensions	Correlation coefficient	Significance level
1	Expert systems	.826**	.000
2	Neural networks	.899**	.000
3	Genetic algorithms	.881**	.000
4	Intelligent agents	.837**	.000

(**)There is a statistically significant correlation at the significance level($p \leq 0.01$)

It is clear from the previous table that all dimensions of the independent variable—artificial intelligence applications—are positively and significantly correlated with each other. The correlations are statistically significant at the 0.01 level, indicating strong internal consistency and interdependence among the dimensions of AI applications.

4.2 Correlation Coefficient Between the Dimensions of the Dependent Variable (Quality of Accounting Information)

To assess the relationships between the dimensions of the dependent variable, namely the quality of accounting information, the Pearson correlation coefficient was again used. This analysis aims to determine the degree of association among the sub-dimensions such as timeliness, suitability, honest representation, comparability, verifiability, and comprehensibility.

Table (3): The Correlation Coefficient Variable

M	Dimensions	Correlation coefficient	Significance level
1	Suitability	.736**	.000
2	Honest representation	.861**	.000
3	Verifiability	.903**	.000
4	Understandability	.873**	.000
5	Comparability	.818**	.000
6	Timing	.766**	.000

(**)There is a statistically significant correlation at the significance level($p \leq 0.01$)

It is clear from the table above that all dimensions of the dependent variable, namely the quality of accounting information, are positively and significantly correlated with the overall construct. The correlations are statistically significant at the 0.01 level, indicating a high degree of internal consistency among the sub-dimensions.

4.3 Reliability Analysis

To assess the internal consistency of the questionnaire items, **Cronbach’s Alpha** was calculated for each dimension: Table (4) shows the results of the Reliability test for the research variables.

Table (4): Stability Test

Degree of stability Alpha	Number of paragraphs	Questionnaire topics
0.671	4	Expert systems
0.791	3	Neural networks
0.831	5	Genetic algorithms
0.786	3	Intelligent agents
0.911	15	Total applications of artificial intelligence
0.704	6	Suitability
0.741	5	Honest representation
0.747	5	Verifiability
0.875	3	Understandability
0.787	5	Comparability
0.603	3	Timing
0.930	27	Total quality of accounting information
0.945	42	The questionnaire in general

It is clear from **Table 4** that the value of the reliability coefficient for the overall data collection tool, in general, was 0.945. This indicates a very high level of reliability, meaning that the consistency of respondents' answers is exceptionally strong. Therefore, the questionnaire can be considered a reliable and effective measurement tool for the purposes of this study.

5. Results and Discussion

5.1 Descriptive Analysis of the Dimensions of the Independent Variable

To assess the level of implementation of artificial intelligence (AI) applications across its dimensions (Expert systems, neural networks, genetic algorithms, and intelligent agents), the arithmetic means, standard deviations, and percentages of the respondents' answers were calculated. The results are presented in the following table:

Table No. (5): Arithmetic Means and Standard Deviations for the Variable "Artificial

M	The dimension	SMA	standard deviation	Availability level	Rank
1	Expert systems	4.3091	.58722	very high	1
2	Neural networks	3.9182	.80515	high	3

M	The dimension	SMA	standard deviation	Availability level	Rank
3	Genetic algorithms	4.0691	.66913	high	2
4	Intelligent agents	3.8242	.88623	high	4
Average		4.0302	.635	high	

It is clear from the table above that the level of artificial intelligence applications was high according to the estimates of the study sample, as it came in an arithmetic average (4.03), with a standard deviation of (0.635). It is also clear from the table that all dimensions of artificial intelligence applications are available at varying levels, and the field of expert systems came in first place with an arithmetic mean (4.31, with a standard deviation of (0.58). It came in second place after genetic algorithms with a mean of (4.07) and a standard deviation of (0.67). Neural networks also came in third place with a mean of (3.92) and a standard deviation of (0.80), and finally, it came in Intelligent agents ranked last with a mean (of 3.82) and a standard deviation (of 0.88).

5.2 Descriptive Analysis of the Dimensions of the Dependent Variable:

Table (6): Explains Arithmetic Averages and Standard Deviations for the Accounting Information Quality Variable

M	The dimension	SMA	standard deviation	Availability level	Rank
1	Suitability	4.512	.436	very high	2
2	Honest Representation	4.381	.558	very high	3
3	Verifiability	4.265	.553	very high	6
4	Understandability	4.278	.690	very high	5
5	Comparability	4.367	.511	very high	4
6	Timing	4.539	.490	very high	1
Average		4.390	.449	very high	

It is clear from the table that the level of accounting information quality was very high according to the participants' estimates, as indicated by an arithmetic mean of 4.39 and a standard deviation of 0.449.

The table also shows that the dimensions of accounting information quality received varying averages. The Timeliness dimension ranked first with a mean of 4.53 and a standard deviation of 0.49. The Suitability dimension came second, with a mean of 4.51 and a standard deviation of 0.43. In third place was Faithful Representation, with a mean of 4.38 and a standard deviation of 0.55.

The Comparability dimension came in fourth, with a mean of 4.36 and a standard deviation of 0.51, followed by Comprehensibility in fifth place, with a mean of 4.27 and a standard deviation of 0.69. Lastly, the Verifiability dimension ranked sixth, with a mean of 4.26 and a standard deviation of 0.55.

5 3. Testing the Study Hypotheses

To test the study hypotheses, several statistical methods were used. The most important of these were Simple Linear Regression Analysis and Multiple Linear Regression Analysis to test the sub-hypotheses of the main hypothesis. In addition, the Independent Samples t-test was applied to examine differences in participants’ opinions regarding artificial intelligence applications and the quality of accounting information.

5.3.1 Testing the Main Hypothesis

The main hypothesis states: “There is no statistically significant effect at the significance level ($\alpha \leq 0.05$) of using artificial intelligence applications (expert systems, neural networks, genetic algorithms, and intelligent agents) on the quality of accounting information.”

To test this hypothesis, a Simple Linear Regression Analysis was conducted. Table (7) presents the regression results and illustrates the degree of variance explained between artificial intelligence applications and the quality of accounting information.

Table (7): Results of Simple Linear Regression Test (Effect of Artificial Intelligence Applications on the Quality of Accounting Information)

R Correlation coefficient	R2 The coefficient of determination	a test F	Sig. F level	Regression β	a test T	Sig.T level
.568	.323	25.280	.000	.403	5.028	.000

It is evident from the data in Table (7) that there is a statistically significant effect of artificial intelligence applications on the quality of accounting information. The coefficient of determination (R^2) indicates that AI applications explain 32.3% of the variance in the quality of accounting information. The calculated F-value was 25.28, significant at the 0.05 level, confirming the presence of a statistically significant impact of AI applications.

As a conclusion, the results indicate that artificial intelligence has a significant positive effect on the quality of accounting information. Therefore, we reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1).

5.3.2 Testing the Sub-Hypotheses

Sub-hypotheses were tested using Multiple Linear Regression Analysis, as detailed in Table (8) below:

Table (8): Summary of Regression Statistics

R Correlation coefficient	The coefficient of determination R Square	amendment R Square	Value F	Significance level
.636	.404	.356	8.471	.000

Table (8) shows that there is a strong positive linear correlation between the combined dimensions of artificial intelligence applications (expert systems, neural networks, genetic algorithms, and intelligent agents) and the quality of accounting information. The Pearson correlation coefficient was 0.636, and the R^2 value indicates that these dimensions together explain 40.4% of the variance in accounting information quality. The F-value (8.471) was statistically significant at $p \leq 0.05$, confirming that the model is suitable for explaining the relationship between independent and dependent variables.

Table (9): Results of Testing Sub-Hypotheses Using Multiple Regression Analysis

Sub-hypothesis text	Regression coefficient β	Standard error	Beta	valueT	Significance level Sig.
There is no statistically significant impact of expert systems on the quality of accounting information.	.081	.130	.106	.626	.534
There is no statistically significant impact of neural networks on the quality of accounting information	.036	.108	.064	.334	.739
There is no statistically significant impact of genetic algorithms on the quality of accounting information	.405	.121	.503	3.344	.002
There is no statistically significant impact of intelligent agents on the quality of accounting information	.005	.076	.009	.062	.951

(*) is statistically significant at the significance level ($p \leq 0.05$)

Interpretation of Sub-Hypotheses Results

Table (9) shows that:

- **Expert Systems:** No statistically significant effect was found. The T-value (0.626) and significance level ($0.534 > 0.05$) indicate that expert systems do not significantly impact the quality of accounting information. Thus, the first sub-hypothesis is accepted.
- **Neural Networks:** Similarly, the T-value (0.334) and significance level ($0.739 > 0.05$) show no statistically significant effect. Therefore, we accept the second sub-hypothesis.
- **Genetic Algorithms:** A statistically significant effect was found, with a β coefficient of 0.405, a T-value of 3.344, and a significance level of 0.002. This supports a positive impact on the quality of accounting information. Hence, the third sub-hypothesis is rejected, and the alternative hypothesis is accepted.
- **Intelligent Agents:** The T-value (0.062) and significance level ($0.951 > 0.05$) indicate no statistically significant effect, leading us to accept the fourth sub-hypothesis.

5.4 Discussion

The findings of this study are consistent with several previous studies, particularly regarding the effectiveness of **genetic algorithms** in enhancing accounting information quality. This dimension outperformed others due to its flexibility, analytical capabilities, and adaptability to real-world accounting problems.

The **limited effect of expert systems, neural networks, and intelligent agents** may be due to contextual and infrastructural limitations in the Yemeni business environment. These technologies often require advanced systems, skilled personnel, and a mature digital ecosystem—elements that may still be underdeveloped in the local context.

This aligns with the observation made by Hassani (2023), who noted that environments lacking technological readiness may fail to realize the full potential of AI technologies. Accordingly, the results emphasize the need for gradual capacity building and strategic implementation of AI in accounting practices.

6. Conclusion and Recommendations

6.1 Conclusion

This study explored the impact of Artificial Intelligence Applications (AIA)—namely expert systems, neural networks, genetic algorithms, and intelligent agents—on the quality of accounting information, using a field-based approach targeting chartered accountants in Sana'a Capital.

The key findings can be summarized as follows:

- **Genetic algorithms** had a statistically significant and positive impact on the quality of accounting information.
- **Expert systems, neural networks, and intelligent agents** did not show statistically significant effects within the research context.
- The professional and technological environment in Yemen may not yet be fully equipped to support the effective deployment of advanced AI technologies that require complex infrastructures.
- Nevertheless, the use of more practical and adaptable AI tools—such as genetic algorithms—has shown real benefits, reflecting their compatibility with the current needs and capacities of accounting professionals.

These results highlight the **strategic importance** of adopting AI tools in accounting, while also emphasizing the **need for capacity building**, infrastructure development, and ongoing professional training to fully benefit from emerging AI technologies.

6.2 Recommendations

Based on the findings, the study presents the following key recommendations:

1. **Adopt training programs and workshops** for chartered accountants to enhance their understanding of AI applications and their relevance to accounting tasks.
2. **Increase investment in technological infrastructure**, particularly in accounting offices and firms, to facilitate the integration of advanced AI systems.
3. **Encourage academic institutions** and professional bodies to include AI-related topics in accounting curricula, especially focusing on practical tools such as genetic algorithms.
4. **Foster collaboration** between AI developers and accounting professionals to design customized tools that align with local business needs and technological capabilities.
5. **Support future research** aimed at exploring the barriers and opportunities for implementing advanced AI applications in the accounting sector, especially in developing economies.
6. **Raise awareness** among stakeholders—including management, auditors, and policy-makers—about the strategic benefits of AI adoption in enhancing the quality, reliability, and timeliness of accounting information.

6.3 Recommendations for Future Studies

1. Investigate the Impact of AI on the Quality of Accounting Information

AI technologies have the potential to automate routine tasks; however, they may also influence the professional judgment and decision-making processes of accountants and auditors. Future studies should explore how AI affects human decision-making, including the dynamics of human-AA interaction and the potential for cognitive biases in AI-assisted decision-making.

2. Assess Changes in Roles and Competencies

Future research can examine how the adoption of AI affects the roles, tasks, and required competencies of professionals in accounting and auditing. It should also consider the necessity for upskilling or reskilling initiatives to meet the evolving demands of the profession.

3. Evaluate the Impact of AI on Audit Quality

Studies should focus on assessing the impact of AI on audit quality, including its capabilities in fraud detection, anomaly identification, and risk assessment enhancement. Such research would provide valuable insights into the effectiveness and limitations of AIA in ensuring accurate and reliable financial reporting.

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