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RESEARCH ARTICLE

The Impact of Artificial Intelligence Implementation of Accounting Information Systems in Commercial Banks Operating in the Tabuk Region

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ARTICLE INFO	ABSTRACT
	The study aimed to evaluate the impact of artificial intelligence on accounting information systems. The study focused on senior and middle management employees in commercial banks across the 48 branches in the Tabuk region. A sample of 205 individuals was selected from this population, and questionnaires were distributed after confirming the validity and reliability of the instrument. The findings of the study revealed that: Machine learning has a significant positive effect on accounting information systems in commercial banks within the Tabuk Region. Natural Language Processing has a significant positive effect on accounting information systems in these banks. Computer Vision also has a significant positive effect on accounting information systems in the Tabuk Region's commercial banks. Based on these results, the study recommends the following: Enhance AI Integration in Accounting Systems: Commercial banks should invest in cutting-edge AI technologies, including machine learning, natural language processing, and computer vision. By incorporating these advanced tools, banks can improve the accuracy, efficiency, and overall performance of their accounting information systems. This will lead to enhanced financial management and more informed decision-making.
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INTRODUCTION

In the current era, accounting has undergone significant evolution due to advancements in technology. Modern tools, particularly those in information and communication technology (ICT) and artificial intelligence (AI), now handle many accounting tasks. These tools include audit toolkits, checklists, and advanced auditing software capable of in-depth data analysis and testing. Integrated audit monitoring units continuously oversee real-time data and processing conditions. Additionally, expert systems and internal control templates are frequently utilized to identify strengths and weaknesses within the system Kogan & Mowen (2019).

Artificial intelligence (AI) first emerged in 1955 with the development of the "Logic Theorist" program by Herbert Simon, Allen Newell, and John Shaw. This early AI program was designed to mimic human problem-solving abilities based on principles of logic. Over the next two decades, advancements in AI flourished as scientists gained a better understanding of computers and as computer storage capacities expanded. This progress significantly benefited accountants by reducing the effort required to process large volumes of data daily, making AI an essential tool in accounting and data management. Russell & Norvig (2020).

With the increasing economic demands of society and the rapid advancement in information technology, we have entered the golden age of artificial intelligence (AI). The application of AI is expected to bring significant changes and growth to the accounting industry. According to recent

research by Luo et al. (2018), the reliance on AI applications in accounting is substantial, particularly in areas such as financial reporting, auditing, and other accounting functions. This advancement is poised to revolutionize the field of accounting by enhancing efficiency and accuracy Luo& Tang. (2018).

In recent decades, there has been a gradual technological advancement aimed at developing "artificially intelligent" systems. The concept and benefits of artificial intelligence have been central to discussions within academic and business communities. The integration of modern technologies has ultimately led to significant transformations in various industries. These advancements often involve substantial investments, resulting in profound changes in processes and operations. Artificial intelligence, particularly when integrated with accounting information systems, is transforming how financial data is processed and analyzed. This integration enhances efficiency, accuracy, and decision-making capabilities in accounting practices. By leveraging AI, organizations can automate routine tasks, improve data analytics, and strengthen internal controls, thereby revolutionizing the field of accounting **Hossain & Rahman (2022).**

The rapid advancement of artificial intelligence (AI) technology has become a global phenomenon, significantly impacting every corner of the world. Its influence has evolved from a minor effect on human labor to a profound transformation in daily life. It is anticipated that within the next two decades, many human roles will be replaced by robots, fundamentally altering various professions. Among those affected will be accounting practitioners, who will encounter significant changes due to AI integration.AI's impact on accounting information systems is particularly noteworthy. AI technologies enhance these systems by automating routine tasks, improving data analysis, and providing predictive insights. This integration leads to increased efficiency, accuracy, and strategic decision-making in accounting practices. As AI continues to advance, its role in transforming accounting processes and systems will become even more pronounced **Sangwan& Singh (2023)**.

Problem statement

The accounting and auditing profession is currently facing numerous challenges due to continuous changes in the global business environment. These global developments have transformed the economic landscape and introduced advanced information and communication technologies into various sectors, including banking and financial services. Consequently, banks and financial institutions have been compelled to adapt to these changes, which have significantly impacted their accounting and auditing procedures.

To tackle these challenges, banks and financial organizations around the world have increasingly adopted sophisticated information technology solutions. This includes the integration of advanced technologies into their auditing processes, either as replacements for or in addition to traditional manual tasks. Such integration is essential for maintaining efficiency and accuracy in financial operations and aligns with the broader global technological revolution.

In this context, technological advancements have driven financial institutions to enhance their practices. Significant efforts are underway to embrace cutting-edge technologies, particularly artificial intelligence (AI), to ensure effective and forward-looking auditing practices. AI has proven to be a transformative tool, enabling machines and systems to perform intelligent behaviors that replicate human cognitive functions. This facilitates the automation of complex accounting and auditing tasks such as reviewing general ledger accounts, ensuring tax compliance, preparing work papers, conducting data analysis, managing expense compliance, detecting fraud, and supporting decision-making processes.

Given this backdrop, this study aims to investigate the impact of AI implementation on accounting information systems specifically in commercial banks operating in the Tabuk Region. The study will explore how AI technologies are influencing the efficiency and effectiveness of accounting practices in these banks and will provide insights into the benefits and challenges associated with their adoption."

Objectives

The study objectives include a primary goal from which several sub-goals are derived, namely:

To examine the impact of artificial intelligence implementation (Machine learning, Natural Language Processing, Computer Vision) on accounting information systems in commercial banks operating in the Tabuk Region.

The primary goal is further divided into several sub-goals as follows:

1. To understand the impact of using artificial intelligence in its dimension (Machine learning) on the quality of accounting information in commercial banks operating in the Tabuk Region.
2. To understand the impact of using artificial intelligence in its dimension (Natural Language Processing) on the quality of accounting information in commercial banks operating in the Tabuk Region.
3. To understand the impact of using artificial intelligence in its dimension (Computer Vision) on the quality of accounting information in commercial banks operating in the Tabuk Region.

Hypotheses

> **H1:** Artificial intelligence (Machine learning) has not significant positive effect on accounting information systems in commercial banks operating in the Tabuk Region.

> **H2:** Artificial intelligence (Natural Language Processing) has not significant positive effect on accounting information systems in commercial banks operating in the Tabuk Region.

> **H3:** Artificial intelligence (Computer Vision) has not significant positive effect on accounting information systems in commercial banks operating in the Tabuk Region.

LITERATURE REVIEW

Artificial intelligence (AI) technologies have brought about a significant transformation in information technology, positioning AI as a cutting-edge branch of computer science. This field focuses on developing smart devices and software capable of performing and interacting in ways that resemble human behavior (Kamble and Shah, 2018). AI is commonly defined as the domain dedicated to enabling machines to carry out tasks involving logic, planning, learning, and perception. While this definition primarily addresses "machines," it can also be broadened to encompass any form of living intelligence, including complex capabilities such as creativity, emotional understanding, and self-awareness (Perez et al., 2018). In a related context, Sutton et al. (2016) assert that artificial intelligence aims to guide computers in performing tasks that humans do, but in a better way. This is achieved through specialized and advanced programming languages designed to simulate human intelligent behavior by equipping computers with software technologies that enable problem-solving. The study also emphasizes that artificial intelligence represents the scientific and technological stream encompassing methods, theories, and techniques aimed at creating machines capable of mimicking human intelligence.

The swift advancement of AI is compelling strategists to rethink and reorganize their business models, particularly in how AI integrates with business processes. This shift is notably impactful in various sectors, including the accounting information systems within commercial banks in the Tabuk Region. The implementation of AI in these systems is expected to enhance efficiency and accuracy in financial operations. However, the full implications of adopting AI in accounting systems for these banks remain largely uncertain (Soni et al., 2019).

Many previous studies have focused on artificial intelligence and its various impacts on the accounting profession. These studies have varied in their focus, covering areas such as auditing or accounting systems in general. The studies to be reviewed encompass a range of temporal and geographical diversity. Among the most significant of these studies are those conducted by: **(Madina, 2021; Li & Zhang, 2018)** These studies agree on the effects of artificial intelligence on accounting and auditing, highlighting several key benefits. The primary impacts include saving time, effort, and money, improving the quality of information, and reducing accounting fraud. The studies also confirm that AI applications minimize errors and enhance the productivity and efficiency of

accountants and auditors. Additionally, AI technologies enable faster processing of documents through natural language processing and computer vision, making daily reports automated and cost-effective. Furthermore, artificial intelligence-driven automation improves various internal accounting processes, such as invoicing, purchase orders, expense reports, and accounts payable and receivable. Beyond these improvements, AI also supports auditing processes and ensures compliance by tracking documents according to regulations and laws.

Ikin & Darmawan (2023). The current study investigates the impact of artificial intelligence (AI) on enhancing the performance of public accounting information systems (AIS) within companies. The findings indicate that AI techniques significantly improve the effectiveness of these systems. The research recommends that organizations align their intelligent systems' activities with their financial objectives to maximize benefits. Firas & Rateb (2021). The primary objective of the study was to examine the impact of artificial intelligence (AI) on enhancing the efficiency of Accounting Information Systems (AIS) and improving non-financial performance standards. The study concluded that AI techniques significantly contribute to the efficiency of AIS by improving the understandability, reliability, credibility, and comparability of outcomes. Additionally, AI demonstrated its capability to impact non-financial performance by providing organizations with critical information that identifies weaknesses for improvement and highlights strengths for exploitation. The study recommended aligning the operations of intelligent systems with the organization's overall goals and ensuring full integration between AIS and accounting information systems.

Kareem & Ben Aissia (2021). This study aims to assess the impact of artificial intelligence on the effectiveness of Accounting Information Systems (AIS) in Jordanian commercial banks listed on the Amman Stock Exchange. The findings indicate that various dimensions of artificial intelligence such as machine learning, deep learning, natural language processing, and computer vision significantly enhance the effectiveness of AIS in these banks. The results highlight that AI technologies have improved efficiency, accuracy, and risk management, while also enabling more strategic resource allocation. As technology progresses, artificial intelligence is anticipated to play an increasingly crucial role in shaping the future of accounting information systems within commercial banking institutions.

(Chukwudi et al., 2018), This study aimed to investigate the impact of artificial intelligence, including expert systems and intelligent agents on the performance of accounting processes among accounting firms in Southeast Nigeria. The study population consisted of accountants and auditors from auditing firms in Anambra State and Enugu State. These participants were selected from 25 accounting and auditing departments within various firms in the two states. The study concluded that the implementation of artificial intelligence positively affects accounting performance. Based on these findings, the study recommended that companies should continually enhance their knowledge of artificial intelligence, as it significantly improves accounting performance and helps reduce certain accounting costs. The study by Huq (2014) aimed to investigate the role of artificial intelligence, particularly expert systems, in the development of accounting systems, with a focus on auditing and taxation, using Perrow's social framework as a basis for comparative organizational analysis of the impact of expert systems on organizational issues. The study examines the relative impact of international organizations on two different types of accounting work: auditing and taxation. The results revealed that artificial intelligence affects factors that ultimately enhance productivity. Overall, the findings indicate that specialized systems enable users to have significant control over problem-solving, improve judgment on whether to follow system recommendations, increase access to senior management, and reduce the need for supervision. Nurul Afza et al., (2024) This study explored the impact of artificial intelligence (AI) on the accounting profession. The findings indicate that the profession is adapting to AI technology, and accountants are encouraged to embrace these advancements to fully leverage AI's potential in their work.

METHODOLOGY

According to Anderson & Poole (2019), methodology is defined as "a set of rules, procedures, or methods that guide the research process or study, and the organized steps that researchers follow to

address the topics they are investigating until they reach a specific conclusion." In her study, the researcher adopted two methodologies as follows:

1. **Descriptive methodology:** This approach is based on observing, describing, and interpreting real-world phenomena and events. It involves collecting detailed data about these phenomena and analyzing their characteristics, relationships, and the influencing factors **Kumar, R. (2020).**

2. **Deductive methodology:** This approach focuses on interpreting the current situation or problem by identifying its conditions, dimensions, and relationships to achieve a precise and comprehensive scientific description of the phenomenon or issue. It is based on relevant facts and not only involves describing the phenomenon but also includes data analysis, measurement, interpretation, and drawing accurate conclusions about the phenomenon or problem. Additionally, it aims to provide solutions and recommendations for addressing the identified issues **Creswell & Creswell (2017)**.

Population and sample of the study

The study population comprises all employees in senior and middle management positions within commercial banks operating in the Tabuk Region, Saudi Arabia. This includes banks engaged in licensed commercial activities in the region, with a total of 48 branches and 280 employees working in senior and middle management roles across various departments, including accounting, internal auditing, information technology, and risk management. For the sample, the researcher referred to Krejcie and Morgan (1970) to determine the appropriate sample size. Based on their recommendations, a sample size of 165 was calculated. To ensure a sufficient number of completed questionnaires for the study and to enhance the reliability of the results, the researcher distributed 205 questionnaires. Out of these, 195 were returned. After excluding 15 invalid responses, 180 valid questionnaires were analyzed. The researcher employed a simple random sampling method to select the sample for this study.

Data sources

The researcher utilized two primary sources for data collection:

Secondary sources: The researcher relied on secondary sources to develop the theoretical framework of the study. These sources included relevant Arabic and international references, journals, articles, reports, and previous research studies related to the study topic. Additionally, the researcher utilized electronic resources available on the internet and various databases to access the latest global research on the subject.

Primary sources: The primary data source consisted of a questionnaire designed to collect data and information pertinent to the study. The questionnaire was specifically developed to align with the study's focus on "The Impact of Artificial Intelligence on Accounting Information Systems." This tool was crafted to gather relevant data and insights from the target audience effectively.

Research instrument

The researcher developed a questionnaire as the primary tool for the study, tailored to address the study's variables. This development was informed by a review of previous research related to the study topic. The questionnaire comprised the following sections:

Artificial intelligence: Items related to the impact and application of artificial intelligence.

Accounting information systems: Items focusing on the integration and effects of artificial intelligence on accounting information systems. The questionnaire was crafted based on existing literature and studies that addressed the variables of interest, ensuring its relevance and effectiveness for collecting pertinent data.

Validity of the tool

The researcher evaluated the tool's validity by examining its apparent validity and ensuring that the hypotheses were aligned with the study's objectives. This process involved presenting the

questionnaire to experts with significant academic and practical expertise, including university professors specializing in Artificial Intelligence and Accounting. The researchers incorporated the experts' suggestions and recommendations regarding the wording of the questions and made the necessary adjustments based on their feedback. Furthermore, the questionnaire was reviewed by several senior and middle-level managers in commercial banks to ensure its clarity and effectiveness.

Reliability of the tool

The reliability of the tool was assessed using Cronbach's Alpha coefficient to check the internal consistency of the questionnaire items. The values obtained are summarized in the following Table) 1):

Table 1: Cronbach's alpha reliability coefficients for each study variable

Variable Number	Variable Name	Cronbach's Alpha
1	Machine learning	0.90
2	Natural Language Processing	0.89
3	Computer Vision	0.87

It can be observed from the table that the reliability coefficients for both the independent variables and the dependent variable are high, indicating acceptable levels for proceeding with statistical analysis of the study data.

STUDY RESULTS

Below is a presentation of the statistical analysis related to testing the study's hypotheses, as follows:

Firstly: Means and standard deviations of the responses from the study sample

Means and standard deviations of the respondents' perceptions regarding the independent variables and the dependent variable, as well as each dimension of these variables, are presented in Table 3. It is evident from this table that the means and standard deviations for both the independent variable "Artificial Intelligence" and the dependent variable "Accounting Information Systems" are relatively high.

It is observed that the mean for the study variables related to Artificial Intelligence is 3.85. Among the dimensions, "Machine Learning" holds the highest rank with a mean of 3.89, followed by "Natural Language Processing" with a mean of 3.86, and then "Computer Vision" with a mean of 3.80. Regarding the dependent variable, "Accounting Information Systems," the mean is relatively high at 3.86.

Table 2: Means and standard deviations of the responses from the study sample

Rank	Dimension Name	Mean	Standard Deviation	Level
1	Machine Learning	3.89	0.65	High
2	Natural Language Processing	3.86	0.67	High
3	Computer Vision	3.80	0.61	High
4	Accounting Information Systems	3.86	0.61	High

Secondly: Testing the study hypotheses

H1: Artificial intelligence (Machine learning) has not significant positive effect on accounting information systems in commercial banks operating in the Tabuk Region.

Table 3: Results of the hypothesis testing

Statement	R	F	β	Sig
Machine Learning on Accounting Information Systems	0.136	8.886	2.959	0.03

Table (3) indicates a statistically significant effect of machine learning on accounting information systems. The correlation coefficient R is 0.136, which reflects a strong positive correlation at a significance level of α≤0.05. The impact coefficient of β value is 2.959, meaning that This means that a one-unit increase in machine learning leads to an increase in accounting information systems by 2.959. The significance of this effect is confirmed by the calculated F of 8.886, which is significant at α≤0.05. Therefore, the second hypothesis is rejected, and the alternative hypothesis is accepted, which states: There is a statistically significant effect at the significance level of α≤0.05 of machine learning on accounting information systems from the perspective of employees in commercial banks in the Tabuk region.

H2: Artificial intelligence (Natural Language Processing) has not significant positive effect on accounting information systems in commercial banks operating in the Tabuk Region.

Table 4: Results of the hypothesis testing

Statement	R	F	β	Sig
Natural Language Processing on Accounting Information Systems	0.138	9.260	2.830	0.03

Table (4) indicates a statistically significant effect of Natural Language Processing on accounting information systems. The correlation coefficient R is 0.138, which reflects a strong positive correlation at a significance level of α≤0.05. The impact coefficient of β value is 2.830, meaning that This means that a one-unit increase in Natural Language Processing leads to an increase in accounting information systems by 2.830. The significance of this effect is confirmed by the calculated F of 9.260, which is significant at α≤0.05. Therefore, the second hypothesis is rejected, and the alternative hypothesis is accepted, which states: There is a statistically significant effect at the significance level of α≤0.05 of Natural Language Processing on accounting information systems from the perspective of employees in commercial banks in the Tabuk region.

H3: Artificial intelligence (Computer Vision) has not significant positive effect on accounting information systems in commercial banks operating in the Tabuk Region.

Table 5: Results of the hypothesis testing

Statement	R	F	β	Sig
Computer Vision on Accounting Information Systems	0.128	6.769	2.974	0.00

Table (5) indicates a statistically significant effect of Computer Vision Processing on accounting information systems. The correlation coefficient R is 0.128, which reflects a strong positive correlation at a significance level of α≤0.05. The impact coefficient of β value is 2.975, meaning that This means that a one-unit increase in Computer Vision leads to an increase in accounting information systems by 2.975. The significance of this effect is confirmed by the calculated F of 6.769, which is significant at α≤0.05. Therefore, the second hypothesis is rejected, and the alternative hypothesis is accepted, which states: There is a statistically significant effect at the significance level of α≤0.05 of Computer Vision on accounting information systems from the perspective of employees in commercial banks in the Tabuk region.

DISCUSSION OF RESULTS WITH PREVIOUS STUDIES

The current study confirms the significant impact of machine learning, natural language processing, and computer vision on accounting information systems, as evidenced by strong positive correlations and substantial β values. These findings align with previous research, which highlights the transformative effects of artificial intelligence (AI) on accounting and auditing. Studies by Madina (2021) and Li & Zhang (2018) emphasize that AI enhances efficiency, reduces errors, and improves the quality of accounting information. Similarly, the research by Ikin & Darmawan (2023) and Firas & Rateb (2021) supports the view that AI techniques significantly boost the performance and effectiveness of accounting information systems, advocating for alignment with financial goals to maximize benefits.

Additionally, the results resonate with Kareem & Ben Aissia (2021), who found that AI dimensions notably improve the effectiveness of accounting systems in Jordanian banks, highlighting advancements in efficiency and risk management. The positive impact of AI on accounting processes, as seen in Chukwudi et al. (2018) and Huq (2014), further supports the notion that AI technologies enhance productivity and decision-making in accounting. Furthermore, Nurul Afza et al. (2024) illustrate the profession's adaptation to AI, underscoring the importance of embracing technological advancements for maximizing AI's potential in accounting practices. Overall, the study's findings corroborate the broad consensus in the literature regarding AI's pivotal role in advancing accounting information systems.

CONCLUSION

The study demonstrates a statistically significant impact of various artificial intelligence (AI) technologies on accounting information systems in commercial banks in the Tabuk region. Specifically, machine learning, natural language processing, and computer vision all show strong positive correlations with improvements in accounting information systems.

Machine Learning: The correlation coefficient (R = 0.136) and the β value (2.959) indicate a robust positive relationship, where a one-unit increase in machine learning corresponds to a 2.959 increase in accounting information systems. This effect is statistically significant, confirmed by an F value of 8.886. Natural Language Processing: Similarly, natural language processing shows a significant positive impact with a correlation coefficient of 0.138 and a β value of 2.830, meaning a one-unit increase leads to a 2.830 increase in accounting information systems. This effect is statistically validated by an F value of 9.260. Computer Vision: Computer vision also significantly affects accounting information systems, with a correlation coefficient of 0.128 and a β value of 2.975, indicating that a one-unit increase results in a 2.975 increase in accounting information systems. The significance is supported by an F value of 6.769.

Overall, these findings underscore the substantial role of AI technologies in enhancing accounting information systems, with each technology contributing positively to system improvements. The results align with existing literature, highlighting the effectiveness of AI in increasing efficiency, accuracy, and overall performance in accounting practices.

RECOMMENDATIONS

Based on the study's findings regarding the significant impact of machine learning, natural language processing, and computer vision on accounting information systems, the following recommendations are proposed:

1. Enhance AI Integration in Accounting Systems: Commercial banks should invest in advanced AI technologies, such as machine learning, natural language processing, and computer vision, to further enhance their accounting information systems. By integrating these AI tools, banks can improve the accuracy, efficiency, and overall performance of their accounting processes, leading to better financial management and decision-making.

2. Train and Develop Staff Skills: It is essential for commercial banks to provide comprehensive training programs for employees to effectively utilize AI technologies. Training should focus on maximizing the benefits of machine learning, natural language processing, and computer vision, enabling staff to fully leverage these tools in their daily accounting tasks. Enhanced skills in AI application will help in optimizing the use of these technologies and improving operational efficiency.

3. Continuously Evaluate and Upgrade AI Solutions: Banks should establish a routine for regularly evaluating and upgrading their AI solutions to keep pace with technological advancements. This includes assessing the performance of machine learning, natural language processing, and computer vision systems and making necessary adjustments or improvements. Staying updated with the latest AI innovations will ensure that the accounting information systems remain effective and aligned with industry best practices.

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