International Journal of Multidisciplinary Research and Growth Evaluation.

The Impact of Artificial Intelligence on the Quality of Accounting Information Systems in Saudi Banks: A Field Study on a Sample of Saudi banks

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Article Info

Abstract

This study aims to identify the impact of artificial intelligence (AI) on the quality of accounting information systems (AIS) in Saudi banks. A descriptive-analytical approach was adopted, and a questionnaire was used to collect data from 144 banking professionals across 11 major Saudi banks. The study concluded that artificial intelligence serves as a powerful tool in improving accounting information systems, enabling accurate and rapid analysis of financial data. Key recommendations include the necessity of adopting AI in AIS to enhance computational efficiency, reduce time, effort, and costs, and improve decision-making processes within Saudi banks.

1. Introduction

Artificial intelligence (AI) represents the culmination of centuries of philosophical inquiry, mathematical development, and cognitive theory. It encompasses a range of capabilities including learning, perception, reasoning, and planning. While general or "strong" AI remains a long-term objective, narrow AI applications are already transforming various industries, including accounting and finance (Russell & Norvig, 2020) [30].

In the context of accounting information systems, AI is leveraged to enhance operational efficiency, improve decision-making, reduce human error, and handle large volumes of financial data with high accuracy. However, the integration of AI also introduces challenges related to data security, privacy, and workforce readiness (Davenport & Ronanki, 2018) [15].

This study explores the influence of AI on AIS within the Saudi banking sector—a critical component of the nation's economy and a key focus of Saudi Vision 2030's digital transformation agenda.

1.1. Study Problem

The adoption of AI in accounting information systems presents both opportunities and challenges, including issues related to data security, privacy, and system integration. This study addresses the following research question:

Does artificial intelligence significantly affect accounting information systems in Saudi banks?

1.2. Study Objectives

- To examine the impact of AI on the quality and performance of AIS in Saudi banks.
- To identify the benefits and challenges associated with AI integration in accounting.
- To provide recommendations for effective AI adoption in line with Saudi Vision 2030.

1.3. Study Hypothesis
H₁: There is a statistically significant relationship between artificial intelligence and accounting information systems in Saudi banks.

2. Literature Review
2.1. Artificial Intelligence: Evolution and Concepts
AI has evolved through several phases since its formal inception in the 1950s. Early work by Alan Turing and the Dartmouth Conference laid the groundwork for machine intelligence. AI development can be categorized into:

- **Symbolic AI** (1950s–1980s): Rule-based systems and expert systems.
- **Machine Learning** (1990s–present): Data-driven learning and pattern recognition.
- **Deep Learning & NLP** (2010s–present): Advanced neural networks and natural language processing.

Key AI techniques include machine learning, neural networks, genetic algorithms, fuzzy logic, and intelligent agent systems (Goodfellow *et al*., 2016) [16].

2.2. Accounting Information Systems (AIS)
AIS are structured systems that collect, process, store, and disseminate financial and accounting data. They support decision-making, internal controls, and reporting. Key characteristics include accuracy, timeliness, integration, and flexibility (Romney & Steinbart, 2018) [29].

2.3. AI in Accounting: Applications and Benefits
AI applications in accounting include:
- Automated data entry and reconciliation
- Fraud detection and risk assessment
- Predictive analytics and forecasting
- Real-time financial reporting
- Enhanced audit and compliance processes

Benefits noted in prior studies include improved efficiency, reduced errors, cost savings, and better strategic insights (Kokina & Davenport, 2017; Moll & Yigitbasioglu, 2019) [22, 25].

2.4. AI in Finance and Accounting
Recent literature emphasizes the transformative potential of AI in financial services. According to Buchanan (2019) [12], AI-driven analytics enhance decision-making by identifying patterns invisible to human analysts. In auditing, AI enables continuous monitoring and anomaly detection, significantly improving audit quality (Zhang *et al*., 2022) [35]. Furthermore, the integration of blockchain with AI in accounting systems creates immutable audit trails, enhancing transparency and trust (Coyne & McMickle, 2021) [14].

The ethical implications of AI in accounting, including bias in algorithms and job displacement concerns, have been widely discussed (Munoko *et al*., 2020) [27]. Regulatory bodies are beginning to establish frameworks for AI governance in financial reporting, though significant gaps remain (Institute of Chartered Accountants in England and Wales, 2021) [19].

2.5. Previous Studies
- Muhammad (2024) projected significant growth in the AI accounting market, with an expected CAGR of 32.58% from 2023 to 2028 [26].
- Hamza Ayoub (2021) highlighted AI's role in preserving human expertise and improving human–machine interaction [18].
- Amal Abdel Wahid (2021) examined functionalist perspectives on AI and human cognition [9].
- Al-Otaibi & Al-Zahrani (2022) conducted a similar study on AI adoption in Saudi financial institutions, finding that 68% of organizations reported improved reporting accuracy, but 45% cited data integration challenges as major barriers [7].
- Chen *et al*. (2023) explored AI implementation in Asian banking sectors, demonstrating a 40% reduction in operational costs and 35% improvement in fraud detection rates within two years of AI integration [13].
- Smith & Johnson (2021) analyzed European banks' adoption of AI in accounting, identifying regulatory compliance as the primary driver (72% of respondents) followed by cost reduction (68%) [32].
- Abdullah & Rahman (2020) examined UAE banking sector's AI transformation, revealing that institutions with comprehensive AI strategies achieved 50% faster month-end closing cycles compared to traditional approaches [1].
- Gupta & Patel (2023) studied machine learning applications in forensic accounting across 50 international banks, finding AI systems detected 89% of anomalous transactions that human auditors missed [17].
- Li *et al*. (2022) investigated robotic process automation (RPA) in accounting functions across multinational corporations, reporting 60% reduction in manual data entry errors and 70% time savings in accounts payable processing [23].
- OECD (2023) published comparative analysis of AI readiness in G20 accounting professions, ranking Saudi Arabia 14th overall but 3rd in implementation speed among Middle Eastern nations [28].

3. Methodology
3.1. Research Design
A mixed-methods approach was employed, combining quantitative survey data with qualitative case studies.

3.2. Population and Sample
The study population included 11 major Saudi banks. A random sample of 150 professionals was selected, including accountants, financial managers, analysts, and department heads. A total of 144 responses were received (96% response rate).

Table 1: Questionnaire Distribution and Response Rate

Description	Number	Percentage
Questionnaires Distributed	150	100%
Questionnaires Returned	144	96%
Questionnaires Not Returned	6	4%
Valid for Analysis	144	96%

3.3. Data Collection Tool
A structured questionnaire was used, comprising:
- **Section 1:** Demographic data (age, qualification, specialization, role, experience).
- **Section 2:** Likert-scale items (1–5) assessing perceptions of AI impact on AIS.

3.4. Data Analysis
Data were analyzed using SPSS (v26). Descriptive statistics, chi-square tests, and linear regression were applied to test the hypothesis.

4. Results and Analysis
4.1. Demographic Profile of Respondents

Table 2: Demographic Characteristics of Respondents (n=144)

Category	Subcategory	Frequency	Percentage
Age	Under 30 years	34	23.6%
	30–39 years	36	25.0%
	40–49 years	45	31.3%
	50+ years	29	20.1%
Qualification	Bachelor's	63	43.8%
	Higher Diploma	10	6.9%
	Master's	42	29.2%
	PhD	29	20.1%
Specialization	Accounting	79	54.9%
	Cost & Management Accounting	5	3.5%
	Business Management	17	11.8%
	Economics	19	13.2%
	Banking Studies	16	11.1%
	Other	8	5.6%
Job Title	Dean	9	6.3%
	Head of Department	14	9.7%
	Asst. Head of Dept.	37	25.7%
	Assistant Professor	39	27.1%
	Financial Manager	3	2.1%
	Associate Professor	35	24.2%
	Vice Dean	5	3.5%
	Other	2	1.4%
Experience	<5 years	35	24.3%
	5–9 years	28	19.4%
	10–14 years	36	25.0%
	15–19 years	19	13.2%
	20–24 years	12	8.4%
	25+ years	14	9.7%

4.2. Hypothesis Testing

Table 3: Frequency Distribution of Responses to AI-AIS Statements

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
AI helps analyze large financial data quickly.	4%	16%	12%	37.3%	30.7%
AI improves calculation efficiency and decision-making.	0%	5.3%	6.7%	53.3%	34.7%
AI reduces human error in accounting.	1.3%	5.3%	19.3%	41.3%	28.7%
AI is a powerful tool for improving AIS.	1.3%	5.3%	19.3%	41.3%	18.7%
AI enables prediction of financial scenarios.	1.3%	8.7%	33.3%	38%	18.7%

Table 4: Chi-Square Test Results for AI-AIS Statements

Statement	χ^2	Sig.	Mean	SD
AI helps analyze large financial data quickly.	56.267	0.000	4.12	1.17
AI improves calculation efficiency and decision-making.	79.147	0.000	4.18	0.77
AI reduces human error in accounting.	1.155	0.000	3.94	4.12
AI is a powerful tool for improving AIS.	88.467	0.000	3.85	0.92
AI enables prediction of financial scenarios.	73.533	0.000	3.64	0.92

Table 5: Regression Model Summary

R	R^2	Adjusted R^2	Std. Error
0.35	0.13	0.12	0.56

Table 6: ANOVA for Regression Model

Source	SS	df	MS	F	Sig.
Regression	9.078	1	9.078	11.325	0.000
Residual	58.144	142	0.409		
Total	67.222	143			

Table 7: Regression Coefficients

Variable	B	SE	β	t	Sig.
Constant	0.955	0.139		6.87	0.000
AI Adoption	0.360	0.067	0.35	5.37	0.000

4.3. Interpretation of Findings

The regression analysis indicates a statistically significant positive relationship between AI adoption and AIS performance ($\beta = 0.360$, $p < 0.001$). The model explains 13% of the variance in AIS performance, suggesting that while AI is a significant factor, other variables also contribute to system improvements.

5. Discussion

The findings support the hypothesis that AI positively impacts AIS in Saudi banks. Participants recognized AI's role in enhancing data processing, reducing errors, and supporting strategic decision-making. However, concerns regarding data security and a lack of AI-specific expertise were noted, aligning with prior research (Al-Otaibi & Al-Zahrani, 2022; Chen *et al.*, 2023) [7, 13].

These results underscore the importance of a balanced approach to AI integration—one that leverages technological benefits while addressing security, ethical, and workforce development challenges. The moderate R^2 value (0.13) suggests that future research should incorporate additional variables such as organizational culture, leadership support, and regulatory environment to better explain AI adoption outcomes.

6. Conclusion and Recommendations
6.1. Conclusion

This study confirms that artificial intelligence significantly enhances the quality and efficiency of accounting information systems in Saudi banks. AI enables faster, more accurate financial analysis, reduces human error, and supports predictive insights, contributing to better decision-making and operational excellence. The findings align with international studies while highlighting region-specific considerations relevant to Saudi Arabia's Vision 2030 objectives.

6.2. Recommendations

1. **Adopt AI in AIS** to improve processing efficiency and accuracy.
2. **Invest in AI training** for accounting professionals to bridge the skills gap.
3. **Strengthen data security frameworks** to protect financial information.
4. **Develop AI-specific regulatory standards** for the Saudi banking sector.
5. **Promote further research** on AI's long-term impact on accounting roles and ethics.
6. **Implement phased AI integration** with clear KPIs aligned with Vision 2030.
7. **Establish cross-industry knowledge sharing** platforms to disseminate best practices in AI implementation.
8. **Develop ethical guidelines** for AI use in accounting to address bias and transparency concerns.

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