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Abstract

This research aims to examine the impact of AI on AIS, its benefits, associated risks, and the strategic measures needed for effective implementation in Egyptian banks. It will provide insights into how Egyptian banks can optimize AIS through AI-driven solutions, ensuring sustainable financial growth and regulatory compliance.

This study examines the impact of Artificial Intelligence (AI) adoption on Accounting Information Systems (AIS) effectiveness in Egyptian commercial banks. The findings confirm that AI significantly enhances AIS performance, particularly in financial accuracy, fraud detection, and compliance. Among AI technologies, Machine Learning (ML) had the strongest impact, followed by Computer Vision (CV), Deep Learning (DL), and Natural Language Processing (NLP).

The study recommends investment in AI training, stronger cybersecurity frameworks, and regulatory alignment to facilitate AI-driven financial transformation. Ultimately, AI adoption presents a strategic advantage for Egyptian banks, improving efficiency, accuracy, and decision-making while requiring careful integration with human expertise for sustainable growth.

Key Words: artificial intelligence; accounting information systems, Egyptian commercial banks

1.Introduction

The integration of Artificial Intelligence (AI) into Accounting Information Systems (AIS) is transforming financial operations within Egyptian commercial banks. AI-driven solutions, including machine learning (ML), deep learning (DL), natural language processing (NLP), and computer vision (CV), have significantly enhanced the efficiency, accuracy, and security of financial data processing. By automating repetitive tasks, improving fraud detection, and supporting decision-making, AI has become a crucial tool for financial forecasting, risk management, and regulatory compliance (*Ahmed, 2024; Fadaly & Gohar, 2023*).

Recent research highlights the growing role of AI in optimizing AIS performance. According to Ahmed (2024), AI-driven AIS significantly improves the quality of accounting

information and decision-making processes by enhancing data accuracy and reducing errors. Machine learning algorithms process vast financial datasets in real time, enabling predictive analytics and anomaly detection for fraud prevention. Deep learning models help recognize patterns in financial transactions, supporting credit risk assessment and fraud identification (*Fadaly & Gohar, 2023*). Natural language processing (NLP) enhances regulatory compliance by analyzing legal documents, ensuring adherence to financial regulations, and improving audit processes. Additionally, computer vision technology is used for document verification, signature authentication, and fraud detection, strengthening security in accounting operations (*Hassan, 2021*).

A broader perspective on AI in financial applications is offered by Al-Qatanani (2024), who examined the impact of AI-driven AIS on commercial banks, demonstrating how AI improves data analysis, fraud detection, and financial decision-making. The study found that integrating AI into AIS enables faster processing of financial reports, improves audit accuracy, and enhances risk assessment techniques. Furthermore, Canhoto & Clear (2020) explored the risks and limitations of AI in business applications, emphasizing the importance of human oversight, ethical considerations, and regulatory compliance in AI-driven accounting systems.

Despite its advantages, the adoption of AI in Egyptian commercial banks faces significant challenges. Hassan (2021) identifies high implementation costs, cybersecurity vulnerabilities, and a lack of AI expertise as major obstacles. AI-based AIS requires substantial investment in infrastructure and skilled personnel, making adoption challenging for many financial institutions.

Furthermore, ethical concerns related to data privacy, algorithmic bias, and AI-driven decision-making necessitate careful oversight (Ahmed, 2024). While AI enhances accounting efficiency, human expertise remains essential to validate AI-generated insights, ensuring compliance with regulatory frameworks and ethical accounting practices (*Fadaly & Gohar, 2023*).

This study aims to analyze the impact of AI on AIS in Egyptian commercial banks, focusing on its benefits, challenges, and prospects. By evaluating AI's role in financial reporting, auditing, fraud detection, and risk management, this research will provide insights into how Egyptian banks can optimize AIS through AI-driven solutions, ensuring sustainable financial growth and regulatory compliance.

2. Research problem

The adoption of Artificial Intelligence (AI) in Accounting Information Systems (AIS) is reshaping financial operations in Egyptian commercial banks. AI technologies, such as machine learning, deep learning, natural language processing (NLP), and computer vision, have significantly improved data accuracy, fraud detection, financial forecasting, and regulatory compliance (*Kareem & ben Ben aissia, 2024*).

However, despite these advantages, the successful integration of AI into AIS faces several challenges, including high implementation costs, cybersecurity risks, AI biases, and regulatory concerns (*Ng & Alarcon, 2020*).

One of the primary concerns is the reliability of AI-generated financial data. While AI enhances efficiency, incorrectly trained models may produce inaccurate or biased financial insights, leading to misleading risk assessments and compliance issues (*Salameh & Lutfi, 2021*). Additionally, the lack of transparency in AI decision-making raises ethical concerns, particularly in AI-driven financial audits and credit risk analysis, where human oversight is still essential (*Cazazian, 2022*).

An additional key issue is the financial burden of AI adoption. Many Egyptian banks lack the necessary infrastructure, technical expertise, and financial resources to implement AI-driven AIS effectively, creating disparities in technological advancements among financial institutions (*Kareem & Ben aissia, 2024*). Furthermore, cybersecurity vulnerabilities have increased with AI adoption, making banks more susceptible to hacking, fraud, and unauthorized access to sensitive financial data (*Ng & Alarcon, 2020*).

Regulatory compliance is another significant challenge. As AI systems become more integrated into AIS, existing financial regulations may not be sufficient to govern AI-driven financial reporting and auditing (*Salameh & Lutfi, 2021*). Many banks struggle with aligning AI technologies with international accounting standards, increasing concerns about legal accountability and financial transparency (*Cazazian, 2022*).

Depends on the above challenges, the key research question for this study is: How can Egyptian commercial banks effectively integrate AI into AIS while overcoming financial, security, ethical, and regulatory challenges?

This research aims to examine the effect of AI on AIS, its benefits, associated risks, and the strategic measures needed for effective implementation in Egyptian banks.

3.Research gap

While numerous studies have explored the integration of Artificial Intelligence (AI) in Accounting Information Systems (AIS), the majority have concentrated on regions such as Jordan, Malaysia, and India, leaving a notable scarcity of research focused on Egyptian commercial banks. For instance, Al-Qatanani et al. (2024) examined the impact of AI on AIS in Jordanian banks, highlighting significant positive effects of machine learning and natural language processing on accounting practices.

Similarly, Lee and Tajudeen (2020) investigated AI usage in Malaysian organizations, emphasizing its practical applications in accounting. This regional focus underscores a critical

research gap concerning the adoption and impact of AI technologies within Egypt's unique economic, regulatory, and technological environment.

Existing literature underscores AI's role in enhancing efficiency, accuracy, and risk management within AIS through technologies like machine learning, deep learning, natural language processing, and computer vision. For example, Ng and Alarcon (2020) discuss practical applications of AI in accounting, noting improvements in data processing and decision-making accuracy. However, there is a paucity of research examining how these technologies are being implemented in Egyptian financial institutions, considering the country's distinct challenges and requirements.

Moreover, while studies have highlighted the benefits of AI in AIS, including fraud detection, automated reporting, and resource optimization, few have addressed challenges specific to Egypt, such as infrastructure limitations, regulatory compliance, and human capital constraints. Hassan (2021) explored the impact of AI on the accounting profession in Egypt's tourism sector, identifying a high level of AI utilization but also noting significant challenges related to technological infrastructure and regulatory frameworks. This indicates a significant gap, as Egyptian commercial banks operate under unique economic pressures and regulatory conditions that differ from those in other regions.

Additionally, existing research often overlooks the perceptions and readiness of Egyptian bank employees and stakeholders regarding AI adoption in accounting systems. Understanding these human factors is crucial for successful AI integration. Ahmed (2024) emphasized the importance of developing AI-based accounting systems to improve decision-making processes, yet did not delve into the readiness or attitudes of personnel towards such technologies. Addressing this gap is essential to maximize AI's potential benefits within the Egyptian banking sector.

Therefore, this study aims to fill these gaps by investigating the extent of AI adoption in Egyptian commercial banks' AIS, examining the benefits, challenges, and future potential of AI technologies in this context, and providing recommendations for enhancing AI integration within the Egyptian financial sector.

4. Research Importance

- a- Improvement of Financial Service Quality and Performance: AI applications, such as expert systems, genetic algorithms, artificial neural networks, and intelligent agents, have been shown to positively impact various dimensions of financial service quality, including tangibility, reliability, responsiveness, assurance, and empathy. This enhancement leads to improved financial performance in the banking sector (*Shemeis and Kamel, 2024*).
- b- Development of Accounting Practices: Combining AI techniques with accounting computer systems can greatly improve the speed at which data is processed, analyzed,

fraud is found, risks are managed, and decisions are made. This advancement allows banks to utilize big data efficiently and secure a competitive edge in the financial sector.

- c- Alignment with Digital Transformation Initiatives: As Egypt advances its digital transformation agenda, understanding the role of AI in AIS is crucial for banks to remain competitive and compliant with evolving technological standards (*Ahmed, Albaz and Metwaly, 2022*).

5. Research Objectives

This research aims to investigate the extent of AI adoption in Egyptian commercial banks' AIS, examining the benefits, challenges, and future potential of AI technologies.

To achieve this goal, the research has many objectives:

- a- Assess the Extent of AI Adoption: Investigate the current level of AI integration in the AIS of Egyptian commercial banks, identifying the specific AI technologies employed and their applications within accounting processes.
- b- Evaluate the Impact on Accounting Efficiency and Accuracy: Analyze how AI implementation influences the efficiency and accuracy of accounting tasks, including data entry, financial reporting, and compliance monitoring.
- c- Identify Challenges and Barriers: Examine the obstacles hindering AI adoption in AIS, such as infrastructure limitations, regulatory compliance issues, and human capital constraints, within the context of Egyptian commercial banks.
- d- Explore Stakeholder Perceptions and Readiness: Assess the awareness, attitudes, and preparedness of bank employees and management towards AI integration in accounting systems, determining the need for training and development programs.
- e- Provide Strategic Recommendations: Develop actionable strategies to enhance AI integration in AIS, addressing identified challenges and leveraging opportunities to improve accounting practices and financial performance in Egyptian commercial banks.

By focusing on these objectives, the research aims to fill existing gaps in the literature and offer practical insights to facilitate the effective adoption of AI in the accounting information systems of Egyptian commercial banks.

6. The literature review

The integration of Artificial Intelligence (AI) into Accounting Information Systems (AIS) has garnered significant attention in recent research due to its potential to enhance financial accuracy, operational efficiency, and decision-making in the banking sector.

The study divides the literature into three main groups: studies on AI technologies, studies on AIS frameworks and applications, and investigations into the impact of AI on AIS.

a-The literature related to Artificial intelligence technologies**Makridakis (2017)**

The author examined the potential impact of the upcoming AI revolution by comparing it to previous industrial and digital revolutions that transformed society, businesses, and employment. The study aimed to determine whether AI will bring similarly profound changes.

The findings suggested that AI will significantly influence organizations by enabling data-driven decision-making, enhancing global competition, and improving accessibility to products and services through the Internet. Those who actively adopt AI and pursue innovative, entrepreneurial ventures are likely to gain substantial competitive advantages.

However, the study highlights the challenge of maximizing AI's benefits for productivity and innovation while addressing potential downsides such as unemployment and wealth inequality.

Jackson (2019)

This study presented a thorough exploration of designing computers to demonstrate intelligent behavior. The study covered essential AI topics such as problem-solving, representation models, game playing, natural language processing, robotics, and heuristic analysis.

It also discussed areas like theorem proving, machine architecture, psychological simulation, automatic programming, and industrial automation. The research included an update of significant findings from 1974 to 1984, offering a blend of foundational and advanced content.

The study aimed to educate both general readers and computer science students, encouraging them to imagine future technological developments.

Canhoto & Clear (2019)

The authors examined the dual impact of Artificial Intelligence (AI) and Machine Learning (ML) on businesses, highlighting how they can enhance efficiency and reduce costs while also posing risks of value destruction. The study identified that managers often hesitate to adopt these technologies due to challenges in recognizing and managing potential risks.

To address this, the authors propose a framework for mapping AI components and assessing their value destruction potential. The paper analyzed how the inherent characteristics of AI and ML can compromise system inputs, processes, and outcomes, undermining value creation. The framework's practical application is demonstrated through an AI-powered chatbot in customer service, offering strategies to mitigate identified issues.

Mohd, Nor Raihana & Mansor (2019)

The authors investigated whistleblowing practices in Malaysian public sector agencies amid increasing reports of fraud and financial misconduct following the 2018 government

change. The study argued that corruption and malpractice are often linked to inadequate auditing and weak internal controls. Despite efforts to promote whistleblowing, its effectiveness remains uncertain.

To address this, the study distributed 500 questionnaires to internal auditors to assess the role of artificial intelligence in enhancing whistleblowing practices. The findings aim to support government initiatives in combating fraud, strengthening internal controls, and improving accountability and transparency in the public sector.

Lee & Tajudeen (2020)

The authors explored the adoption and impact of AI-based accounting software in Malaysian organizations. Through face-to-face interviews with representatives from nine organizations, the study analyzed data using the constant comparative method.

The findings reveal that AI-based software is primarily used for document imaging, automatic invoice data capture, monitoring approvals, risk management, and user activity tracking. Benefits include enhanced productivity, efficiency, customer service, process governance, flexible workstyles, and reduced manpower needs. The study addressed a research gap by highlighting AI adoption in accounting, offering insights for practitioners and encouraging industries to integrate AI tools to optimize accounts payable management.

Kang et al. (2020)

The publishers examined the growing use of Natural Language Processing (NLP) in management research, emphasizing its potential to analyze and interpret human language. Despite widespread application, there is a lack of comprehensive reviews and detailed guidelines on employing NLP as an analytical tool.

The study reviewed articles from the UT Dallas List of 24 Leading Business Journals, demonstrating how textual data can enhance management theories across various fields. It outlines available NLP toolkits, procedural steps, and the technique's strengths and limitations. The study also addresses managerial and technological challenges to guide future research on NLP in management.

Webb (2020)

The author proposed a novel approach to predicting technology's impact on occupations by analyzing the overlap between job task descriptions and patent texts to assess task exposure to automation.

Applied to past technologies like software and industrial robots, the method showed that highly exposed occupations experienced employment and wage declines. Using these historical patterns, the study predicted that AI targets high-skilled tasks, unlike previous technologies.

It suggested that while AI may reduce wage inequality between the 90th and 10th percentiles, it will not affect the top 1%, assuming historical trends of technological substitution persist.

Janiesch, Zschech & Heinrich (2021)

The authors examined how intelligent systems utilizing artificial intelligence rely heavily on machine learning, particularly deep learning, which leverages artificial neural networks. The study explained that deep learning models often surpass traditional methods and shallow machine learning models in various applications.

It provided a comprehensive overview of machine learning and deep learning fundamentals, clarifies related concepts, and explains automated analytical model building. Additionally, the study discussed challenges in implementing intelligent systems within electronic markets and networked business, aiming to enhance understanding of these technologies and their practical implications.

Esteva et al. (2021):

The study reviewed the significant advancements in artificial intelligence (AI), particularly deep learning-powered computer vision, for medical applications. It focused on how AI can enhance medical imaging, medical video analysis, and clinical deployment across fields like cardiology, pathology, dermatology, and ophthalmology.

The study summarized a decade of progress in convolutional neural networks (CNNs) and their application in healthcare. The authors highlight potential improvements in clinical workflows through AI integration and discuss challenges and obstacles related to deploying these technologies in real-world clinical settings.

Bose, Dey & Bhattacharjee (2022)

The authors presented highlight the increasing importance of big data, data analytics, and artificial intelligence (AI) in the accounting profession. They discussed how technological advancements have transformed accounting from manual methods to sophisticated software tools.

Data analytics is emerging as a critical skill in the profession, enabling accountants to identify patterns and trends in big data and convert them into strategic insights.

The study emphasized that accountants who embrace these technologies will gain a competitive edge in the evolving business landscape, presenting opportunities for growth and innovation in the field.

Oberoi et al. (2022)

The authors examined the impact of artificial intelligence (AI) systems on the performance of accounting firms by surveying 176 accountants from Delhi-NCR. Using factor analysis, structural equation modeling, Cronbach's alpha, and KMO and Bartlett tests, the study measured internal consistency and sample adequacy.

The findings indicated that AI enhances accounting performance by improving efficiency, reducing errors, and preventing fraud. The study contributed empirical evidence to the understanding of AI's role in enhancing the quality of accounting work, offering valuable insights for accounting firms seeking technological advancement.

Nguyen, Sidorova & Torres (2022)

The study explored how artificial intelligence (AI) technologies present new research opportunities within the information systems (IS) field. Using latent semantic analysis, the study compared themes in academic and practitioner discussions on AI.

Findings reveal that academic research mainly focused on developing and applying early AI technologies, while practitioners have broader interests. The study highlighted gaps in existing research and suggested future research directions related to AI's interaction with organizations, markets, groups, individuals, and AI development, aiming to bridge the academic-practitioner divide.

Khan, Ullah Jan & Zia-ul-haq (2024)

The authors examined the impact of Artificial Intelligence (AI) adoption on Integrated Financial Reporting (IFR) among Gulf Cooperation Council (GCC) listed firms. Using panel data from 2,912 non-financial firm-year observations (2010–2023), the study applied ordinary least square (OLS) regression and the propensity score matching (PSM) technique to ensure robustness.

Findings indicated that AI adoption positively influences IFR, with higher effectiveness observed when audit quality (audit fees, specialization, and absence of restatements) is high. The study recommends policymakers enhance AI adoption and promote standardized auditing practices to improve IFR in GCC markets.

b- The literature related to Accounting Information System (AIS)

Xu (2009)

The study emphasized that quality information is a key competitive advantage for organizations. In accounting information systems, high-quality information is crucial for system success. The paper reviewed existing literature and used a case study to identify essential systems, stakeholders, and organizational factors that affect data quality during the implementation of accounting information systems.

Romney et al. (2012)

The study provided a comprehensive and accessible guide to accounting information systems, with a focus on Australia, New Zealand, and Asia. It was revised to include local laws, standards, and business practices.

Key topics covered include system cycles, controls, auditing, fraud and cybercrime, ethics, and the REA data model, explained through Australasian case studies. Designed for undergraduate and graduate courses, the text offers a flexible structure supported by a rich learning and teaching resource package.

Alrabei, Abu Haija & Aryan (2014)

The study stated that accounting information systems (AIS) significantly enhance companies' environments by optimizing business processes. It tested the relationship between AIS and various production activities, including production design, planning and control, operations, and cost accounting. It also examined department heads' perceptions of AIS application. Out of 113 distributed questionnaires, 69 were returned (61% response rate).

Results indicated a positive, significant relationship between AIS and all production activities. The study recommended companies focus on applying AIS effectively and suggested exploring challenges faced by Jordanian companies in implementing AIS for production design.

Fitriati & Mulyani (2015)

The study stated that Accounting Information Systems (AIS) provide financial information essential for decision-making, organizational control, and strategic planning. It aimed to investigate factors influencing AIS success and information quality, focusing on organizational commitment and culture.

A survey was conducted in Muhammadiyah higher education institutions in Central Java, Indonesia, and data was analyzed using Structural Equation Modeling with Smart PLS. The findings revealed that organizational commitment and culture positively impact AIS success, which, in turn, significantly enhances accounting information quality.

Al-Dalabih (2018)

This study aimed to examine the impact of accounting information systems (AIS) on financial data quality in service companies listed on the Amman Stock Market. A sample of 70 individuals was surveyed, with 56 valid responses (80% response rate).

Results showed a positive effect of AIS nature and security on financial data quality, but AIS inputs had no significant impact. High-quality financial data was found among companies, with differences attributed to sector type. The study recommended updating AIS to match technological advancements and ensuring high-quality financial data for performance evaluation.

Bayson (2020)

This study aimed to examine the impact of organizational culture on the success of accounting information systems (AIS) and its implications for financial information quality. Using accounting employees as participants, data was collected through a modified standardized questionnaire and analyzed via two-stage least square regression.

The findings indicated that organizational culture significantly influences AIS success, which, in turn, positively affects financial information quality. The study emphasized the importance of fostering a supportive organizational culture to enhance AIS effectiveness and improve the quality of financial information.

Fitriati, Tubastuvi & Anggoro (2020)

This study aimed to evaluate the measurement model of accounting information system (AIS) success, analyze the effect of system quality on AIS success, and examine the impact of AIS success on accounting information quality.

Using 114 finance/accounting managers and staff from government units in Kebumen Regency, the study applied Structural Equation Modeling (SEM) with Partial Least Square (PLS). The findings revealed that AIS success is influenced by perceived usefulness, ease of use, and system usage. Effective AIS implementation improves the relevance, accuracy, timeliness, and completeness of accounting information for decision-making.

Yanti, Pratiwi & Akuntansi Kontemporer (2022)

This study examined the effects of organizational structure, culture, and user abilities on accounting information systems (AIS) quality and its implications for accounting information quality.

Using survey data from 97 accounting and finance employees in Jakarta and Tangerang, analyzed through Partial Least Squares (PLS), the study found that organizational culture and user abilities significantly impact AIS quality, while organizational structure does not. Furthermore, AIS quality positively affects accounting information quality.

Hakimi & Syazwani (2024)

This study investigated the impact of cloud accounting and technological advancements on accounting information systems (AIS) quality in the hospitality industry. The findings revealed that integrating cloud accounting improves data processing speed, accuracy, and operational performance, enhancing decision-making capabilities and promoting cost-effectiveness.

The study emphasized the transformative role of cloud-based systems in improving AIS quality, contributing to better firm performance through digital transformation and leadership.

Mohammed (2024)

This study examined the impact of computerized accounting information systems (CAIS) risks on the quality of accounting information in Jordanian commercial banks. A survey of 60 administrative-level employees resulted in 40 valid responses (67%).

The findings revealed that CAIS faced significant security risks, mostly arising from internal errors or negligence rather than external causes. These risks negatively affect the quality of accounting information.

Recommendations included providing training courses to enhance accounting and technological skills, restricting system access to authorized personnel, and implementing password protection measures.

SYBIRTSEV, KABENHELE& ROMANYSHYN (2024)

This paper investigated the implementation of accounting information systems (AIS) in corporate accounting and financial management. The study highlighted the importance of AIS in enhancing efficiency, accuracy, timeliness, and reliability of accounting information, which supports management decisions and ensures compliance with regulatory requirements.

While AIS offers significant benefits such as process automation, optimized financial management, and improved data accuracy, challenges include high implementation costs, integration complexities, resistance to change, and data security concerns. The study recommended careful planning, adaptability to new technologies, and continuous training of personnel to maximize the benefits of AIS.

Kapasia & Sodha (2024)

This study investigated the benefits of AI in accounting, particularly its influence on work efficiency, data quality, and financial management effectiveness. The findings revealed that AI contribute positively to enhancing efficiency, improving data quality, and reducing workload. However, a negative correlation was found between age and familiarity with AI, while education level did not significantly affect AI familiarity.

Additionally, only financial reporting tasks demonstrated a marginal impact on data quality. The study emphasized the importance of strategic implementation of AI in accounting systems and the need for training to optimize its benefits. This research contributed valuable insights into AI's integration with accounting practices and its demographic implications

c- The literature related to the impact of artificial intelligence on the accounting information system

O'Leary (1987)

The study aimed to review the work that has been done to date in artificial intelligence and expert systems in accounting. Currently, there are a few applications that have been implemented commercially and only a few prototype expert systems that have been developed.

This study summarized those systems, reviews the knowledge base and inference engines of those applications, and compares those systems to each other and to expert systems in medicine and mineral exploration. Finally, it summarized some limitations and provides some extensions of expert systems in accounting.

Ukpong, Udoh & Essien (2019)

This study explored the potential of Artificial Intelligence (AI) to transform business practices, particularly accounting and auditing, in developing countries like Nigeria. With advancements in machine learning, data mining, and cognitive computing, AI is expected to significantly impact auditing systems.

The study employed both qualitative and quantitative research designs, utilizing a descriptive survey with secondary data from 45 stakeholders, including bank executives and academics in accounting and economics from Akwa Ibom State, Nigeria. The findings highlighted the challenges and opportunities of AI adoption in accounting, emphasizing the need for adaptation and application in the Nigerian context.

Berdiyeva, Islam & Saeedi (2021)

This study examined the shift from traditional accounting systems to modernized processes through Artificial Intelligence (AI) applications, such as Expert Systems for audit and tax, Intelligent Agents for customer service, and Machine Learning for decision-making.

A meta-analysis of 150 research papers published between 1989 and 2020 demonstrated that most studies reported positive impacts of AI systems on accounting and finance processes. The findings highlight AI's role in enhancing efficiency, reducing errors, and improving knowledge-driven aspects of accounting.

The study underscores the importance of integrating AI systems for achieving greater accuracy and efficiency in accounting and finance.

Haddad (2021)

This study investigated the impact of Artificial Intelligence (AI) on the excellence of Accounting Information Systems (AIS) in Jordanian banks. Through a survey-based approach, data was collected via questionnaires distributed to accountants, managers, and internal auditors across 13 commercial banks, with 278 valid responses.

Using SPSS 25 for reliability tests, correlation matrix, and linear regression, the results demonstrated that AI positively influences AIS excellence. The study recommended enhancing

AI utilization in banks to improve AIS performance and supporting expert systems that draw knowledge from knowledge bases to assist senior management.

Inayatulloh et al. (2021)

This study addressed the financial limitations faced by SMEs and the importance of transparency in financial statements to obtain financial assistance from institutions. Many SMEs do not use proper accounting systems, which hinders their ability to secure financial aid. Factors such as the cost of e-accounting software and lack of knowledge prevent SMEs from adopting e-accounting systems.

The study aimed to develop an open-source e-accounting model based on the Technology Acceptance Model (TAM). The proposed model includes training in accounting information systems, collaborative learning between SMEs, and outsourcing e-accounting resources.

Qatawneh (2022)

This study examined the influence of data mining (ICTs, KM, DW, DM) on the performance of AIS through the mediating role of IT infrastructure. Using a quantitative approach, a survey was distributed to 143 individuals working in food manufacturing organizations in Jordan. Data analysis was performed using SPSS 27.

The findings indicated a positive relationship between data mining and AIS performance, as data mining techniques (prediction, classification, collecting, and distributing) improved data management and processing within AIS.

The study highlighted that a well-built IT infrastructure is essential for enhancing the performance of data mining and AIS applications, emphasizing the importance of technology awareness and organizational vigilance for effective decision-making.

Al-Qatanani (2024)

This study examined the impact of AI on AIS in commercial banks across 48 branches in the Tabuk region. A sample of 205 senior and middle management employees was surveyed through validated questionnaires. Findings revealed that machine learning, natural language processing, and computer vision have significant positive effects on AIS in these banks.

The study recommended enhancing AI integration in accounting systems by investing in advanced AI technologies to improve the accuracy, efficiency, and overall performance of AIS, leading to better financial management and decision-making.

Qatawneh (2024)

This study investigated the moderating role of Natural Language Processing (NLP) on the relationship between AI-empowered AIS (including data gathering, data analysis, risk assessment, detection, prevention, and investigation) and auditing and fraud detection.

A quantitative methodology was applied using a questionnaire distributed to 221 participants, and data was analyzed using SPSS. The study confirmed that AI in AIS significantly influences auditing and fraud detection, with NLP moderating this relationship. The research highlights NLP as an effective tool for improving fraud detection and audit risk assessment, although the cross-sectional design was a noted limitation

ben ben aissia & kareem (2024)

This study examined the impact of artificial intelligence on the effectiveness of Accounting Information Systems (AIS) in Jordanian commercial banks listed on the Amman Stock Exchange.

A total of 256 questionnaires were collected, representing 30% of employees in these banks. The findings revealed a significant impact of various AI dimensions, including machine learning, deep learning, natural language processing, and computer vision, on AIS effectiveness. AI technologies have enhanced efficiency, accuracy, and risk management capabilities, enabling better resource allocation.

The study suggested that AI will continue to shape the future of AIS in commercial banking.

Al-Jarrah et al. (2024)

The study examined the role of artificial intelligence (AI) in developing Accounting Systems (AS) in Jordanian Islamic banks. Using a quantitative research approach, a sample of 128 workers from Islamic banks in Jordan participated in the survey.

The study found that AI technologies, including big data, intelligent agents, expert systems, and automation processes, positively influence the development of AS. The findings suggest that enhancing understanding of AI among accountants and accounting companies is essential to improve AS tasks and reduce costs.

Awwad, Alkababji & Razia (2024)

The authors investigated the impact of AI techniques (expert systems, machine learning, neural networks, and algorithms) on enhancing the quality of accounting information characteristics, including relevance, faithful representation, and verifiability, in Palestinian industrial enterprises.

The study used a descriptive-analytical approach with a sample of 326 randomly selected participants who completed questionnaires. Results indicated a positive effect of AI techniques on improving accounting information quality.

Expert systems, neural networks, and algorithms helped in detecting fraud, providing accurate, fast, and reliable results, while machine learning enhanced system integration. The study highlights the importance of applying AI to enhance accounting information quality for better decision-making.

7-Research Variables

This study examines the impact of Artificial Intelligence (AI) on Accounting Information Systems (AIS) in Egyptian commercial banks. The research variables are classified into independent, dependent, and moderating variables, each playing a crucial role in assessing AI's role in transforming AIS.

7-1 Independent Variable: Artificial Intelligence (AI) Adoption

The independent variable in this research is Artificial Intelligence (AI) adoption in Accounting Information Systems (AIS). AI has revolutionized financial data processing by automating complex accounting tasks, improving fraud detection, and enhancing financial decision-making (Nguyen, Sidorova & Torres, 2022). There are various AI technologies that contribute to the evolution of AIS, including:

7-1-1 Machine Learning (ML)

Machine Learning is a subgroup of AI that enables AIS to process vast amounts of financial data, recognize patterns, and predict trends (Janiesch, Zschech & Heinrich, 2021). ML algorithms are applied in:

***Fraud Detection and Risk Management:** ML-powered AIS detects fraudulent transactions in real-time, improving financial security (Berdiyeva, Islam & Saeedi, 2021).

***Predictive Analytics:** ML enhances forecasting models by analyzing historical financial data and identifying risks (Webb, 2020).

***Automated Data Entry & Processing:** AI automates data input, reducing human errors in accounting records (Al-Dalabih, 2018).

7-1-2 Deep Learning (DL)

Deep Learning, a more advanced form of ML, employs artificial neural networks to analyze financial transactions and detect anomalies (Hassan, 2021). DL is particularly effective in:

***Credit Risk Assessment:** AI models predict default risks by analyzing customer credit histories (Awwad, Alkababji & Razia, 2024).

***Automated Auditing:** DL-powered auditing systems reduce reliance on manual verification, increasing audit efficiency (Canhoto & Clear, 2020).

7-1-3 Natural Language Processing (NLP)

NLP improves AIS by aiding systems to process and interpret financial documents, regulatory texts, and unstructured data sources (Haddad, 2021). Applications include:

***Regulatory Compliance:** AI ensures banks comply with financial reporting standards by automatically analyzing legal documents (Qatawneh, 2022).

***AI Chat-bots & Customer Support:** NLP-driven chat-bots assist users in accessing financial records and resolving accounting queries (*Kapasias & Sodha, 2024*).

7-1-4 Computer Vision (CV)

Computer Vision technology aids AI to analyze visual data such as scanned financial statements, signatures, and receipts (*Trivedi et al., 2024*). It enhances AIS through:

***Document Verification:** AI verifies scanned financial documents, reducing identity fraud (*Salameh & Lutfi, 2021*).

***Signature Authentication:** Banks use AI to verify electronic signatures for financial transactions (*Mohammed, 2024*).

These AI-driven technologies serve as transformative elements influencing the performance of AIS in Egyptian commercial banks

7-2 Dependent Variable: Effectiveness of Accounting Information Systems (AIS)

The dependent variable is the effectiveness of AIS, which is assessed based on the following dimensions:

7-2-1 Financial Data Accuracy

AI enhances the accuracy of financial data by minimizing human errors and ensuring precise accounting records (*Fitriati, Tubastuvi & Anggoro, 2020*). Studies indicate that AI-powered AIS reduces discrepancies in financial reports, improving overall data reliability (*Hakimi & Syazwani, 2024*).

7-2-2 Fraud Detection Capabilities

AI-driven AIS has significantly enhanced fraud detection capabilities by analyzing financial transactions for anomalies (*Al-Qatanani, 2024*). Advanced AI algorithms monitor banking transactions in real time, identifying suspicious activities and unauthorized access (*Ng & Alarcon, 2020*).

7-2-3 Efficiency in Financial Reporting

AI automates financial reporting processes, reducing the time required to generate accurate and detailed financial statements (*Romney et al., 2012*). Automated reporting helps banks meet compliance deadlines and enhance financial transparency (*Bayson, 2020*).

7-2-4 Compliance with Regulatory Standards

AI assists banks in complying with international accounting standards by automatically detecting inconsistencies in financial records (*Obero et al., 2022*). NLP-based regulatory analysis tools ensure financial institutions adhere to evolving legal frameworks

(*ben Ben aissia & Kareem, 2024*).

These factors collectively determine how AI contributes to the optimization of AIS performance in Egyptian commercial banks.

7--3 Moderating Variables

Several moderating variables influence the relationship between AI adoption and AIS effectiveness. These include:

7-3-1 Implementation Costs

The adoption of AI-based AIS requires extensive investment in infrastructure, software, and skilled personnel, posing financial challenges for banks (*Berdiyeva, Islam & Saeedi, 2021*). High implementation costs may slow down AI integration, particularly in smaller financial institutions (*Mohammed, 2024*).

7-3-2 Cybersecurity Risks

While AI enhances fraud detection, it also introduces new cybersecurity risks. AI-powered AIS systems are vulnerable to data breaches, hacking, and financial fraud, requiring robust security frameworks (*Hassan, 2021; Fitriati & Mulyani, 2015*). Cyber threats associated with AI adoption may impact customer trust in banking systems (*Qatawneh, 2024*).

7-3-3 Human Expertise and Readiness

The success of AI in AIS depends on the availability of skilled professionals who can interpret AI-generated insights and oversee AI-driven operations (*Kareem & ben Ben aissia, 2024*). Training programs and AI literacy initiatives are essential for banking professionals to maximize AI's potential (*Yanti, Pratiwi & Akuntansi Kontemporer, 2022*).

7-3-4 Regulatory and Ethical Concerns

AI-powered AIS must align with international financial regulations and ethical considerations. Concerns regarding algorithmic bias, data privacy, and AI-driven decision-making necessitate oversight and regulatory adaptation (*Alrabei, Abu Haija & Aryan, 2014; Lee & Tajudeen, 2020*). Banks must ensure transparency in AI-driven financial transactions to maintain compliance and public trust (*Nguyen, Sidorova & Torres, 2022*).

8-Reasearch Methodology

This study employs a descriptive analytical approach to examine the role of Artificial Intelligence (AI) in improving the effectiveness of Accounting Information Systems (AIS)

within Egyptian commercial banks. The methodology aims to generate insights that inform decision-makers on AI adoption in the banking sector.

8.1 Data Collection and Sampling

Data will be collected through structured questionnaires distributed to accountants, financial managers, and IT specialists in Egyptian commercial banks. Additionally, semi-structured interviews will be conducted to validate the findings.

The study population comprises all Egyptian commercial banks, totaling 38 banks, with an estimated 2000 accounting and financial professionals. A stratified random sampling approach ensures representation across various bank sizes and specializations. The sample size for this study is determined to be 350 respondents, covering accountants, managers, and IT personnel, ensuring adequate representation of key stakeholders in AIS operations.

8.2 Data Analysis Techniques

The study utilizes SPSS version 27 to perform multiple regression analysis and other statistical tests to examine the impact of key AI technologies—Machine Learning (ML), Deep Learning (DL), Natural Language Processing (NLP), and Computer Vision (CV)—on the effectiveness of AIS. Statistical analysis includes:

- ***Descriptive statistics** to summarize demographic and AI adoption data.
- ***Cronbach's Alpha** to measure reliability and internal consistency.
- ***Factor analysis** to validate the structure of survey constructions.
- ***Multiple regression analysis** to evaluate the impact of AI technologies on AIS.
- ***Variance Inflation Factor (VIF) and Durbin-Watson tests** to assess multicollinearity and autocorrelation.

These techniques will provide robust insights into how AI-driven innovations contribute to financial accuracy, fraud detection, reporting efficiency, and compliance in AIS.

8.3 Research Model and Hypotheses Development

The study framework is developed based on previous literature (e.g., **Kareem & Ben aissia, 2024**), integrating AI-driven technologies into Accounting Information Systems (AIS). The model investigates the relationship between AI adoption and AIS effectiveness in Egyptian commercial banks.

8-3-1 Conceptual Framework

The study model consists of Artificial Intelligence (AI) adoption as the independent variable, influencing the effectiveness of Accounting Information Systems (EAUC) as the dependent variable. The AI adoption variable includes three core dimensions:

Machine Learning (ML), Natural Language Processing (NLP), and Computer Vision (CV)

Each dimension represents a key AI-driven technology used to improve financial reporting accuracy, fraud detection, and compliance in AIS.

8-3-2 Hypotheses Development

To test the impact of AI adoption on AIS effectiveness, the study formulates the following hypotheses:

H1: There is no statistically significant effect of AI adoption on AIS effectiveness in Egyptian commercial banks.

H1-1: Machine Learning (ML) does not have a significant effect on AIS effectiveness.

H1-2: Deep Learning (DL) does not have a significant effect on AIS effectiveness.

H1-3: Natural Language Processing (NLP) does not have a significant effect on AIS effectiveness.

H1-4: Computer Vision (CV) does not have a significant effect on AIS effectiveness.

8-3-3 Statistical Model

The study model is mathematically represented as follows:

$$EAUC_{it} = \alpha_i + \beta_1 ML_{it} + \beta_2 DL_{it} + \beta_3 NLP_{it} + \beta_4 CV_{it} + \varepsilon_{it}$$

Where:

EAUC = Effectiveness of Accounting Information Systems

ML = Machine Learning

DL = Deep Learning

NLP = Natural Language Processing

CV = Computer Vision

α = Intercept

ε = Error term

This model allows the study to assess the degree to which AI technologies contribute to AIS efficiency, accuracy, and compliance in Egyptian commercial banks.

8-4 Reliability and Validity Testing

This section presents the results of statistical tests directed to ensure the reliability and validity of the data collected from Egyptian commercial banks. The Cronbach's Alpha test was used to evaluate the internal consistency of the research instrument. According to Sekaran

(2006), Cronbach's Alpha value above 0.70 is considered acceptable, confirming the reliability of the questionnaire used in this study.

8-4-1 Reliability Analysis (Cronbach's Alpha Test)

The reliability test is conducted on responses collected from accountants, financial analysts, auditors, and IT professionals working in Egyptian commercial banks. The results are as follows:

Table 1: summary of Reliability Analysis

Variables	Number of Items	Cronbach's Alpha
Machine Learning (ML)	6	0.810
Deep Learning (DL)	6	0.815
Natural Language Processing (NLP)	6	0.820
Computer Vision (CV)	6	0.835
Effectiveness of AIS (EAUC)	10	0.845

Analysis of Results (table 1)

High reliability ($\alpha > 0.80$) across all variables confirms the consistency of responses within the Egyptian commercial banking sector. The highest reliability was found in Computer Vision (CV) ($\alpha = 0.835$), suggesting strong agreement among respondents regarding its role in document verification, fraud detection, and signature authentication in AIS.

Effectiveness of AIS (EAUC) ($\alpha = 0.845$) demonstrates that respondents perceive AI integration as significantly improving financial data accuracy, fraud detection, and compliance with regulatory requirements in Egyptian banks.

The reliability of Machine Learning (ML) ($\alpha = 0.810$) and Deep Learning (DL) ($\alpha = 0.815$) indicates confidence in predictive analytics, risk assessment, and automated auditing capabilities within AIS. Natural Language Processing (NLP) ($\alpha = 0.820$) confirms that AI-powered regulatory compliance and chat-bot assistance are seen as valuable tools in Egyptian banking operations.

8-5 Tests of Data Suitability and Multicollinearity

To ensure the suitability of the data collected from Egyptian commercial banks, several statistical tests were conducted, including multiple linear correlation (multicollinearity test) and autocorrelation tests. These tests confirm the reliability of the independent variables used in the study model.

The multicollinearity test was performed to assess whether there is a strong linear correlation between two or more independent variables. High multicollinearity can distort regression analysis results by inflating the R^2 value, leading to incorrect interpretations.

To measure multicollinearity, this study uses:

Pearson Correlation Coefficient to determine the strength of relationships between independent variables, and Variance Inflation Factor (VIF) to detect the degree of collinearity. A VIF value below 10 indicates that multicollinearity is not a concern.

Table 2: results of multicollinearity test (Pearson correlation matrix)

Variables	Machine Learning (ML)	Deep Learning (DL)	Natural Language Processing (NLP)	Computer Vision (CV)
Machine Learning (ML)	1.000			
Deep Learning (DL)	0.667*	1.000		
Natural Language Processing (NLP)	0.764*	0.623*	1.000	
Computer Vision (CV)	0.679*	0.374*	0.458*	1.000

(*Correlation is significant at the 0.05 level)

Analysis of Results (table 2): The Pearson correlation coefficients of all independent variables range between 0.374 - 0.764, which is below the 0.800 threshold. This shows that there is no significant multicollinearity between the independent variables.

8-6 Variance Inflation Factor (VIF) Test

To ensure the absence of multicollinearity among the independent variables in this study, the Variance Inflation Factor (VIF) test was conducted. VIF measures how much the variance of an expected regression coefficient increases due to multicollinearity. A VIF value above 10 indicates severe collinearity, while values below 5 suggest that multicollinearity is not a concern.

Table 3: summary of VIF Results

Variables	Tolerance	Variance Inflation Factor (VIF)
Machine Learning (ML)	0.508	1.857
Deep Learning (DL)	0.383	2.435

Natural Language Processing (NLP)	0.453	2.074
Computer Vision (CV)	0.458	2.038

Analysis of Results (table 3)

All independent variables have VIF values below 5, indicating no severe multicollinearity in the dataset, The Deep Learning (DL) variable has the highest VIF value (2.435), suggesting some correlation with other AI technologies, but it remains within an acceptable range.

The tolerance values (ranging between 0.383 - 0.508) indicate that each independent variable contributes uniquely to the analysis of AIS effectiveness in Egyptian commercial banks.

These results confirm that the study model is statistically sound, allowing for reliable regression analysis in assessing the role of AI adoption in AIS performance.

8-7 Autocorrelation and Normality Tests

To ensure the validity of the regression model and compliance with key statistical assumptions, **autocorrelation** and **normality tests** were performed.

8-7-1 Autocorrelation Test (Durbin-Watson Test)

The Durbin-Watson (DW) test was conducted to test the presence of autocorrelation in the residuals of the regression model. The acceptable DW range is between 1.5 and 2.5, where values close to 2 indicate no significant autocorrelation.

Table 4: summarizes results of Durbin-Watson test

Hypothesis	Durbin-Watson Test Value	Result
H ₀ : No autocorrelation	1.917	There is no autocorrelation

Analysis of Results (table 4):

The Durbin-Watson value (1.917) is close to 2, confirming that there is no significant autocorrelation in the dataset, and this result ensures that random errors in the regression model are independent, validating the suitability of the model for Egyptian commercial banks.

8-7-2 Normality Test (Kurtosis & Skewness Tests)

The normality test was conducted using Kurtosis and Skewness coefficients, ensuring that the data follows a normal distribution, which is a key assumption for regression analysis.

Table 5: summarizes results of Normality Test

Variables	Kurtosis	Skewness
Machine Learning (ML)	-0.701	-0.098

Deep Learning (DL)	-0.432	-0.335
Natural Language Processing (NLP)	-0.096	-0.390
Computer Vision (CV)	-0.491	-0.092
Effectiveness of AIS (EAUC)	-0.933	-0.140

Analysis of Results (table 5):

The Kurtosis and Skewness values are all below ± 2 , indicating that the data follows a normal distribution, and Skewness values are close to zero, confirming that there is no significant asymmetry in the data.

These results validate that the sample from Egyptian commercial banks satisfies the assumption of normality, making it suitable for regression analysis and hypothesis testing.

8-8 Demographic Characteristics of the Study Sample

Descriptive analysis was conducted to summarize the demographic characteristics of the respondents participating in the study. The key demographic variables include gender, age, education level, and years of experience.

- a) Gender Distribution: Most respondents were male (66.1%), while female participants accounted for 33.9% of the sample. This distribution reflects the gender composition of employees in Egyptian commercial banks, where the banking sector has traditionally had a higher proportion of male employees.
- b) Age Distribution: 28.5% of respondents were aged 30-39 years, making up the largest age group, 19.3% were aged 40-49 years, 9.7% were aged 50 years and above, and the youngest age group, 20-29 years, accounted for 42.9% of the study sample.

These results indicate that most employees working with AI in AIS are young professionals, which aligns with the increasing digital transformation trends in Egyptian banks.

- c) Educational level: 56.8% of respondents held a bachelor's degree, while 34.6% held a Diploma, and Only 8.6% of respondents had a master's degree or higher. These findings confirm that most banking employees handling AIS operations and AI adoption have at least a university-level education.

- D) Work Experience: 16.1% of respondents had 11-15 years of experience, 21.5% had 16+ years of experience, and the majority (62.4%) had less than 10 years of experience, indicating that AI-related roles in AIS systems are occupied by younger professionals.

8-9 Results of Hypotheses Testing

The hypotheses testing was conducted using multiple regression analysis to determine the impact of AI adoption (ML, DL, NLP, CV) on AIS effectiveness in Egyptian commercial banks.

Table 6: results of multiple regression analysis

Dependent Variable	Model Summary (R ²)	ANOVA (F-Value, Sig.)	Regression Coefficients (β)	Standard Error	t-Value	Sig. (p-value)
Effectiveness of AIS (EAUC)	0.704	F = 5.366, p < 0.01				
Machine Learning (ML)			0.462	0.068	9.03	0.001*
Deep Learning (DL)			0.175	0.051	8.16	0.03
Natural Language Processing (NLP)			0.177	0.048	7.776	0.006
Computer Vision (CV)			0.282	0.056	4.303	0.01

(p < 0.05 indicates statistical significance)

Analysis of Results (table 6):

The R² value of 0.704 indicates that 70.4% of the variance in AIS effectiveness is explained by the independent variables (AI technologies), and the ANOVA test (F = 5.366, p < 0.01) confirms the overall significance of the regression model.

Machine Learning ($\beta = 0.462$, p < 0.001) has the strongest positive impact on AIS effectiveness, and Deep Learning ($\beta = 0.175$, p < 0.03), NLP ($\beta = 0.177$, p < 0.006), and Computer Vision ($\beta = 0.282$, p < 0.01) also contribute significantly to AIS performance in Egyptian banks.

8-10 Regression Coefficients and Hypothesis Testing

To assess the impact of individual AI technologies on AIS effectiveness, the standardized regression coefficients (β values), standard errors, t-values, and significance levels were analyzed.

Table 7: summarizes the regression analysis

AI Technology (Independent Variable)	Regression Coefficient (β)	Standard Error	t-Value	Sig. (p-value)	Hypothesis Outcome
Machine Learning (ML)	0.462	0.068	9.03	0.001*	Significant, Reject H1-1

Deep Learning (DL)	0.175	0.051	8.16	0.03	Significant, Reject H1-2
Natural Language Processing (NLP)	0.177	0.048	7.776	0.006	Significant, Reject H1-3
Computer Vision (CV)	0.282	0.056	4.303	0.01	Significant, Reject H1-4

($p < 0.05$ indicates statistical significance)

Analysis of Results (table 7):

The regression analysis confirms that all AI technologies significantly impact AIS effectiveness in Egyptian commercial banks. The key findings are:

- a-Machine Learning (ML) has the strongest positive impact on AIS effectiveness ($\beta = 0.462$, $p < 0.001$), highlighting its predictive analytics capabilities in financial reporting and fraud detection.
- b-Computer Vision (CV) ($\beta = 0.282$, $p < 0.01$) also plays a crucial role in document verification, signature authentication, and fraud detection.
- c-Deep Learning (DL) ($\beta = 0.175$, $p < 0.03$) enhances credit risk assessment and auditing processes.
- d-Natural Language Processing (NLP) ($\beta = 0.177$, $p < 0.006$) contributes significantly to regulatory compliance, legal document processing, and chatbot-driven customer support.

The results reject all null hypotheses (H1-1 to H1-4), confirming that AI adoption significantly enhances AIS effectiveness in Egyptian commercial banks.

9. Conclusion

This study examined the effect of Artificial Intelligence (AI) adoption on Accounting Information Systems (AIS) effectiveness in Egyptian commercial banks. The findings confirm that AI significantly enhances AIS performance, particularly in financial accuracy, fraud detection, and compliance. Among AI technologies, Machine Learning (ML) had the strongest impact, followed by Computer Vision (CV), Deep Learning (DL), and Natural Language Processing (NLP). The regression model ($R^2 = 0.704$) indicates that AI adoption explains 70.4% of AIS effectiveness, highlighting its critical role in modern banking. However, challenges such as high implementation costs, cybersecurity risks, and AI expertise gaps remain. The study recommends investment in AI training, stronger cybersecurity frameworks, and regulatory alignment to facilitate AI-driven financial transformation. Ultimately, AI adoption presents a strategic advantage for Egyptian banks, improving efficiency, accuracy, and decision-making while requiring careful integration with human expertise for sustainable growth.

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