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Artificial Intelligence Adoption and Performance Efficiency in Accounting Systems in Emerging Economies: An Analytics Maturity Perspective

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ABSTRACT

Artificial Intelligence (AI) is increasingly transforming accounting systems by enhancing automation, analytical capability, and decision support. However, evidence remains limited on how analytics maturity influences the relationship between AI adoption and accounting system performance, particularly in emerging economies. This study examined the association between AI adoption and performance efficiency in accounting systems, with analytics maturity examined as an indirect mechanism. The Technology Acceptance Model (TAM) and the Resource-Based View (RBV) served as the supporting theoretical lenses, while analytics maturity was operationalized using the Data Analytics Maturity Indicators (DAMI) composite measurement index.

A cross-sectional descriptive and explanatory survey design was employed. Primary data were collected from 300 accounting and finance professionals working in banking, manufacturing, telecommunications, and public sector organizations across Lagos, Abuja, Port Harcourt, and Ibadan, Nigeria. The data were analysed using descriptive statistics, multiple regression, and mediation analysis with the PROCESS macro and bootstrap confidence intervals.

The findings indicate that AI adoption is positively associated with performance efficiency ($\beta = 0.36$, $p < .001$). Analytics maturity demonstrated a statistically significant indirect association (indirect effect = 0.32, 95% CI [0.24, 0.40]), providing evidence consistent with partial mediation within the sample. The model explained 68% of the variance in performance efficiency ($R^2 = 0.68$). Respondents also identified major implementation challenges, including data interoperability issues (86.2%), cloud latency (83.5%), API incompatibility (81.7%), algorithm transparency gaps (79.8%), and fragmented data governance (77.4%).

The study contributes to the literature by integrating AI adoption and analytics maturity within a single empirical framework for accounting systems in an emerging economy. The findings highlight the importance of complementing AI adoption with organizational analytics capabilities and may inform organizational strategies, professional practice, and policy initiatives aimed at strengthening AI-enabled accounting systems.

Keywords: Artificial Intelligence; Analytics Maturity; Data Analytics Maturity Indicators (DAMI); Accounting Systems; Performance Efficiency; Emerging Economies; Technology Acceptance Model; Resource-Based View

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INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) and data analytics is transforming accounting systems by enabling greater automation, predictive capability, and real-time financial decision-making. Accounting Information Systems (AIS), which traditionally focused on transaction processing and financial record keeping, are increasingly evolving into intelligent digital platforms that support continuous monitoring, automated reporting, fraud detection, and strategic decision support [1,2]. These developments have encouraged organizations to integrate AI technologies into accounting functions to improve operational efficiency, information quality, and organizational responsiveness.

Although AI adoption has accelerated globally, organizations in emerging economies continue to face significant implementation challenges. Limited digital infrastructure, fragmented data environments, shortages of analytical expertise, and evolving governance frameworks often constrain the effective deployment of AI-enabled accounting systems. Consequently, the adoption of AI technologies does not necessarily translate into improved organizational performance unless supported by complementary capabilities that enable organizations to effectively manage, integrate, and utilize data.

Existing research has examined AI adoption, accounting system efficiency, predictive analytics, and digital transformation independently. However, relatively limited empirical attention has been given to the role of analytics maturity as an organizational capability that may explain how

AI adoption is associated with improved accounting system performance. Analytics maturity extends beyond the implementation of AI technologies by reflecting an organization's capacity to collect, integrate, analyse, and apply data to support evidence-based financial decision-making. Accordingly, AI adoption and analytics maturity are related but conceptually distinct constructs; while AI adoption represents the technological input, analytics maturity represents the organizational capability required to derive value from that technology.

The Nigerian context provides an appropriate setting for examining this relationship because organizations are increasingly investing in digital accounting technologies while continuing to experience challenges related to interoperability, cloud integration, data governance, and analytical capability development. According to the Financial Reporting Council of Nigeria, fewer than one-quarter of organizations have reached advanced levels of AI and analytics maturity, highlighting the need to better understand the organizational capabilities that support successful AI-enabled accounting transformation [3].

Against this background, this study examines the association between AI adoption and performance efficiency in accounting systems, with analytics maturity examined as an indirect mechanism linking technological adoption with organizational performance. Drawing on the Technology Acceptance Model (TAM) and the Resource-Based View (RBV), the study contributes to the literature by integrating technological and organizational capability perspectives within an emerging economy context. The findings provide empirical evidence that may inform researchers, practitioners, and policymakers seeking to strengthen AI-enabled accounting systems and analytics capability development.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Artificial Intelligence Adoption in Accounting Systems

Artificial Intelligence (AI) adoption has increasingly transformed accounting systems from traditional transaction-processing platforms into intelligent information environments capable of supporting automation, prediction, and real-time decision-making. AI technologies, including machine learning, natural language processing, and intelligent automation, are being integrated into accounting activities such as financial reporting, auditing, fraud detection, forecasting, and management decision support. This transition reflects a broader shift from rule-based accounting processes toward data-driven systems that can analyse large volumes of financial information and generate actionable insights.

Recent studies indicate that AI adoption can improve accounting system efficiency by reducing repetitive manual tasks, accelerating information processing, and enhancing the accuracy and timeliness of financial outputs. AI-enabled accounting applications allow organizations to automate reporting procedures, identify patterns in financial data, and support predictive analysis for improved resource allocation and planning. However, the effectiveness of AI adoption depends not only on the availability of technological tools but also on organizational capabilities, including data infrastructure, employee competencies, and governance mechanisms.

In emerging economies, AI adoption presents both opportunities and implementation challenges. Organizations can benefit from improved accounting automation and enhanced analytical capabilities; however, limitations related to digital infrastructure, data quality, interoperability, cloud integration, and regulatory readiness may restrict the realization of these benefits. These challenges are particularly relevant in developing contexts where organizations are still building the technological and institutional capabilities required for advanced analytics adoption.

Therefore, AI adoption should be understood as an enabling technological capability rather than a standalone determinant of improved accounting outcomes. The extent to which organizations achieve performance benefits depends on their ability to develop complementary analytical capabilities that allow AI-generated information to be effectively utilized. This distinction provides the foundation for examining analytics maturity as a potential mechanism linking AI adoption with accounting system performance efficiency.

Analytics Maturity in Accounting Systems

Analytics maturity represents an organization's capability to systematically collect, manage, analyse, and utilize data to support operational and strategic decision-making. Unlike AI adoption, which reflects the implementation and use of artificial intelligence technologies, analytics maturity captures the broader organizational capability required to convert technological investments into meaningful business value. It incorporates elements such as data quality, analytical skills, information integration, governance structures, and the ability to generate actionable insights from financial information.

Within accounting systems, analytics maturity reflects the progression from basic descriptive reporting toward more advanced analytical capabilities. Organizations with lower maturity levels may primarily rely on historical reporting and manual analysis, while more mature organizations employ diagnostic, predictive, prescriptive, and increasingly autonomous analytics capabilities to support forecasting, risk identification, and real-time decision-making. This progression highlights that the presence of AI tools alone does not guarantee improved accounting performance unless organizations possess the supporting capabilities necessary for effective utilization.

Prior research emphasizes that analytics capability functions as an important organizational resource by enabling firms to transform data into knowledge and improve decision processes. From a Resource-Based View (RBV) perspective, analytics maturity may represent a valuable internal capability because it combines technological resources, human expertise, and organizational processes that are difficult to replicate. Therefore, organizations with higher analytics maturity are better positioned to maximize the benefits associated with AI-enabled accounting systems.

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In emerging economies, analytics maturity is particularly important because organizations often face constraints related to fragmented data systems, limited digital infrastructure, skills shortages, and governance challenges. Developing analytics maturity can help organizations overcome these barriers by improving data integration, strengthening analytical processes, and supporting responsible adoption of AI technologies.

Accordingly, this study conceptualizes analytics maturity as a capability that may explain how AI adoption becomes associated with improved accounting system performance efficiency. The Data Analytics Maturity Indicators (DAMI) index is therefore used as a composite measurement approach to capture organizational analytical capabilities across multiple maturity dimensions.

AI Adoption, Analytics Maturity, and Accounting Performance Efficiency

The relationship between Artificial Intelligence adoption and accounting system performance efficiency extends beyond the direct implementation of technological tools. While AI provides organizations with advanced capabilities for automation, pattern recognition, and predictive analysis, the extent to which these capabilities improve accounting outcomes depends on the organization's ability to manage and utilize data effectively. Analytics maturity therefore represents an important organizational capability that may influence how AI adoption translates into improved accounting performance.

Accounting system performance efficiency can be reflected through improvements in reporting speed, decision accuracy, operational responsiveness, and reduction of processing delays. AI-enabled accounting systems can support these outcomes by automating repetitive activities, improving access to financial information, and enabling more timely analysis. However, organizations with limited analytical maturity may not fully realize these benefits because of weaknesses in data quality, system integration, analytical expertise, and governance processes.

Previous research suggests that digital technologies create greater organizational value when supported by complementary capabilities. The Resource-Based View (RBV) explains that technological resources alone may not provide sustained value unless they are combined with organizational capabilities that enable effective utilization. In this context, AI adoption represents a technological resource, while analytics maturity represents the organizational capability required to transform AI-generated information into operational improvements.

Similarly, the Technology Acceptance Model (TAM) provides insight into how user acceptance and perceived usefulness influence the effective utilization of AI-based accounting technologies. When accounting professionals perceive AI systems as useful and accessible, adoption is more likely to support improved analytical practices and decision processes. Therefore, both technological acceptance and organizational analytical capability are relevant in explaining AI-enabled accounting performance.

Although existing studies have examined AI adoption and accounting transformation, limited empirical evidence exists regarding the role of analytics maturity as an associated mechanism between AI adoption and performance efficiency, particularly within emerging economy contexts. This study addresses this gap by examining whether analytics maturity provides an explanatory pathway through which AI adoption is associated with improved accounting system performance outcomes.

Supporting Theoretical Lenses

This study is guided by two primary supporting lenses: the Technology Acceptance Model (TAM) and the Resource-Based View (RBV). Diffusion of Innovation (DOI) is included as a supplementary contextual perspective to explain the broader organizational spread of AI-enabled accounting practices. These perspectives provide complementary explanations of how AI technologies are adopted and how organizations develop the capabilities required to achieve value from such technologies.

Technology Acceptance Model (TAM)

The Technology Acceptance Model proposed by Davis explains how users' perceptions of technological usefulness and ease of use influence technology acceptance and utilization [4]. In accounting environments, TAM provides a basis for understanding how accounting and finance professionals adopt AI-enabled tools for reporting, analysis, and decision support. When users perceive AI applications as beneficial for improving accuracy, reducing workload, and enhancing decision processes, adoption and effective utilization are more likely to occur.

In this study, TAM supports the examination of AI adoption as an enabling technological factor associated with improved analytics-related capabilities. However, TAM primarily focuses on individual acceptance behaviour and does not fully explain the organizational capabilities required to transform AI adoption into measurable performance improvements. Therefore, an additional organizational perspective is required.

Resource-Based View (RBV)

The Resource-Based View introduced by Barney explains how organizations achieve value through the development and effective utilization of valuable internal resources and capabilities [5]. Within AI-enabled accounting systems, AI technologies alone may not generate improved outcomes unless organizations possess complementary capabilities, including data management, analytical skills, infrastructure, and governance processes.

From an RBV perspective, analytics maturity represents an organizational capability that enables firms to transform AI investments into improved accounting system performance. Organizations with higher analytics maturity are better positioned to integrate data sources, apply advanced analytical techniques, and utilize AI-generated insights for operational and strategic decisions.

Diffusion of Innovation (DOI)

Diffusion of Innovation theory Rogers, provides supplementary context for understanding how AI-enabled accounting practices spread across organizations and sectors [6]. Adoption patterns may differ depending on organizational readiness, perceived advantages, compatibility with existing systems, and available resources. This perspective is particularly relevant in emerging

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economies where organizations vary significantly in technological infrastructure and digital capability.

Together, these theoretical perspectives provide a combined explanation of AI adoption and performance efficiency. TAM explains the acceptance and use of AI technologies, RBV explains the development of analytics maturity as an organizational capability, and DOI provides contextual understanding of technology diffusion across organizations. These lenses support the proposed relationship between AI adoption, analytics maturity, and accounting system performance efficiency.

Research Hypotheses Development

Based on the reviewed literature and supporting theoretical perspectives, this study proposes that AI adoption is associated with improvements in analytics capabilities and accounting system performance efficiency. The hypotheses are developed by considering AI adoption as a technological capability and analytics maturity as an organizational capability that may explain the relationship between technology adoption and performance outcomes.

AI Adoption and Analytics Capabilities

AI adoption enables organizations to process financial information more efficiently through automation, advanced analytics, and real-time information processing. AI-supported accounting systems can improve the availability and quality of analytical information by reducing manual processing requirements and enabling faster interpretation of financial data. Therefore, organizations with higher levels of AI adoption are expected to demonstrate stronger real-time analytics capabilities.

H_1: AI adoption is positively associated with real-time analytics capability.

AI-enabled accounting systems increasingly depend on integrated digital infrastructures, including cloud-based platforms that support data accessibility, scalability, and system connectivity. Effective AI utilization requires compatibility between AI applications and existing accounting information systems. Organizations with greater AI adoption may therefore demonstrate improved cloud integration efficiency.

H_2: AI adoption is positively associated with cloud integration efficiency.

AI adoption can enhance data-driven decision responsiveness by enabling faster analysis, predictive insights, and automated reporting processes. When accounting professionals effectively utilize AI-supported analytical tools, organizations may respond more quickly to financial changes and operational requirements. Consistent with TAM, perceived usefulness and effective utilization of AI technologies may contribute to improved decision-support capabilities.

H_3: AI adoption is positively associated with data-driven decision responsiveness.

Although AI adoption provides access to advanced technological capabilities, organizational benefits depend on complementary resources such as data governance, analytical skills, and information management processes. From an RBV perspective, analytics maturity represents an internal capability that allows organizations to transform AI resources into operational value. Therefore, AI adoption is expected to be associated with higher overall analytics maturity.

H_4: AI adoption is positively associated with overall analytics maturity.

Analytics Maturity as an Associated Mechanism

Analytics maturity enables organizations to transform available data into meaningful insights through improved analytical processes, infrastructure, and decision capabilities. While AI adoption provides technological capability, analytics maturity determines the extent to which organizations can effectively utilize AI-generated information. Higher analytics maturity may therefore be associated with improved accounting system performance efficiency through faster reporting, improved decision accuracy, and enhanced operational responsiveness.

Accordingly, analytics maturity is examined as an indirect pathway linking AI adoption with performance efficiency.

H_5: Analytics maturity shows a statistically significant indirect association between AI adoption and performance efficiency.

All hypotheses are evaluated as statistical associations rather than causal relationships due to the cross-sectional observational design of the study.

Measurement of Analytics Maturity (DAMI Composite Measurement Index)

Analytics maturity was operationalized using the Data Analytics Maturity Indicators (DAMI), a composite measurement index developed for this study to capture the extent to which organizations possess the capabilities required to utilize data analytics within accounting systems. The DAMI approach was informed by prior analytics maturity literature, including maturity models that describe organizational progression from basic reporting capabilities to advanced predictive and autonomous analytical functions [7,8].

The DAMI index is designed as a measurement instrument rather than a theoretical framework. It captures multiple dimensions of organizational analytics capability, including data availability, analytical processing capability, integration capacity, decision-support effectiveness, and the use of advanced analytics within accounting operations. The purpose of the index is to measure the level of analytics capability present within organizations adopting AI-enabled accounting systems.

The measurement approach recognizes that AI adoption and analytics maturity represent related but distinct concepts. AI adoption refers to the implementation and use of AI-based technologies, whereas analytics maturity reflects the organizational capability to effectively manage, analyse, and apply data generated through these technologies. Therefore, organizations may adopt AI tools but achieve different levels of analytics maturity depending on their infrastructure, skills, governance mechanisms, and analytical processes.

The DAMI index consists of 12 measurement items covering key analytics maturity dimensions. Responses were collected

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using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate greater organizational capability in applying analytics for accounting-related activities.

The maturity dimensions include:

Analytics maturity dimension	Description
Data management capability	Ability to collect, organize, and maintain reliable accounting data
System integration capability	Ability to connect accounting systems with analytical and digital platforms
Descriptive analytics capability	Ability to generate accurate historical reports and performance summaries
Diagnostic analytics capability	Ability to identify causes and patterns underlying financial outcomes
Predictive analytics capability	Ability to forecast trends and anticipate future financial conditions
Prescriptive analytics capability	Ability to support decision recommendations using analytical insights
Governance capability	Ability to manage data quality, security, and responsible analytics use

Table 1: Dimensions and Descriptions of Accounting Analytics Maturity

The composite DAMI score was calculated by aggregating responses across the measurement items. Reliability and validity assessment procedures were conducted to evaluate the consistency and suitability of the index. The DAMI scale demonstrated acceptable internal consistency (Cronbach's α = 0.87), supporting its use as a study-specific measure of analytics maturity within AI-enabled accounting environments.

Because the DAMI index is developed within the context of emerging economy accounting systems, further validation across different industries and geographical contexts is recommended in future research.

METHODOLOGY

Research Design

This study adopted a cross-sectional descriptive and explanatory survey design to examine the associations among Artificial Intelligence (AI) adoption, analytics maturity, and performance efficiency in accounting systems. The descriptive component was used to identify the extent of AI adoption, analytics maturity levels, and perceived performance outcomes among accounting and finance professionals. The explanatory component was applied to examine the statistical relationships between AI adoption, analytics maturity, and accounting system performance efficiency.

A quantitative approach was considered appropriate because the study aimed to measure relationships among defined constructs using standardized indicators and statistical analysis. The research design enables the assessment of patterns of association within organizations that have adopted AI-enabled accounting technologies while maintaining appropriate limitations regarding causal interpretation.

The cross-sectional design involved collecting data from respondents at a single point in time. Although this approach is suitable for identifying statistical relationships among variables, the findings are interpreted as associations rather than causal effects. Therefore, the reported relationships between AI adoption, analytics maturity, and performance efficiency should be understood within the context of the sampled organizations and study period.

The unit of analysis was the organization-level accounting system environment, represented through responses from accounting and finance professionals who possessed relevant knowledge of their organizations' technology adoption practices, analytical capabilities, and accounting performance processes.

Population and Sample

The study population consisted of accounting and finance professionals working in medium and large organizations in Nigeria. This population was selected because accounting and finance professionals are directly involved in the implementation, utilization, and evaluation of accounting information systems, including AI-enabled analytical applications. According to the Institute of Chartered Accountants of Nigeria, the professional accounting population in Nigeria exceeds 45,000 members, representing a relevant pool for examining technology adoption within accounting environments [9].

The required sample size was determined using Yamane's sample size formula at a 95% confidence level and a 5% margin of error. Based on the estimated population the initial target sample was 320 respondents. After data screening and removal of incomplete responses, 300 valid responses were retained for analysis, representing a usable response rate of 93.8%. The final sample size was considered adequate for the statistical analyses conducted, including regression analysis and mediation testing.

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A purposive sampling approach was first applied to identify organizations that met the study inclusion criteria. Organizations were eligible for inclusion if they had implemented at least one AI-enabled accounting or analytics tool for a minimum period of six months. This criterion ensured that respondents had sufficient exposure and experience to evaluate AI adoption practices and their relationship with analytics capabilities and accounting performance outcomes.

Following organization selection, stratified sampling procedures were applied to improve representation across major economic sectors. The selected sectors included banking, manufacturing, telecommunications, and public sector organizations. These sectors were selected because they represent areas where accounting information systems, digital transformation initiatives, and data-driven decision processes are increasingly relevant.

The geographical scope covered four major Nigerian locations: Lagos, Abuja, Port Harcourt, and Ibadan. These locations were selected because they represent significant business, financial, industrial, and administrative centres with relatively higher levels of digital technology adoption.

Respondents were required to have professional involvement in accounting, finance, auditing, financial reporting, or related information system activities. This ensured that participants possessed relevant knowledge regarding AI adoption, analytics capabilities, and accounting system performance within their organizations.

Data Collection Instrument

Data were collected using a structured questionnaire developed from established concepts in Artificial Intelligence adoption, analytics maturity, and accounting system performance literature. The questionnaire was designed to measure the study constructs and obtain information regarding organizational AI implementation practices, analytical capabilities, perceived performance outcomes, and implementation challenges.

The questionnaire consisted of five sections: AI adoption, analytics maturity (DAMI), performance efficiency, reported implementation constraints, and demographic characteristics. All construct-related items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

AI adoption was measured using five items capturing the extent to which organizations utilize AI-enabled accounting applications, including intelligent reporting systems, predictive analytics tools, automated processing systems, and real-time analytical applications. The measurement reflects the technological adoption dimension of the study.

Analytics maturity was measured using the Data Analytics Maturity Indicators (DAMI) composite index. The 12-item scale assessed organizational capabilities related to data management, system integration, analytical processing, decision-support capability, and governance practices. DAMI was designed to capture the organizational capability required to effectively utilize AI-generated information.

Performance efficiency was measured using four items assessing accounting system outcomes, including reporting cycle improvement, decision accuracy, operational responsiveness, and reduction of processing delays. These indicators reflect perceived improvements in accounting system effectiveness associated with digital transformation initiatives.

Reported constraints were measured using five items capturing common barriers affecting AI-enabled accounting implementation, including data interoperability challenges, cloud integration limitations, API compatibility issues, algorithm transparency concerns, and data governance fragmentation.

A summary of construct operationalization is presented below:

Construct	Measurement focus	Number of items	Measurement basis
AI adoption	Use and implementation of AI-enabled accounting technologies	5 items	AI adoption literature
Analytics maturity (DAMI)	Data capability, integration, analytics capability, governance, and decision support	12 items	Analytics maturity literature
Performance efficiency	Reporting speed, decision accuracy, responsiveness, and processing efficiency	4 items	Accounting system performance literature
Implementation constraints	Technology and governance challenges affecting AI adoption	5 items	Digital transformation literature

Table 2: Constructs, Measurement Focus, Number of Items, and Measurement Basis

The questionnaire was administered through both electronic and physical distribution channels. Electronic responses were collected through Google Forms, while physical distribution was used to reach respondents within selected organizations. The combination of collection methods improved accessibility while maintaining consistency in the measurement instrument.

Reliability and Validity

The reliability and validity of the measurement instruments were assessed to ensure that the constructs used in the study

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were consistent and appropriate for empirical analysis. Reliability assessment examined the internal consistency of measurement items, while validity assessment evaluated whether the instruments adequately represented the intended constructs.

Internal consistency reliability was assessed using Cronbach's alpha coefficient. The results indicated acceptable reliability levels for all major constructs: AI adoption (α = 0.85), analytics maturity measured through the DAMI index (α = 0.87), and performance efficiency (α = 0.86). The overall scale reliability was α = 0.88. These values exceed the commonly accepted threshold of 0.70, indicating satisfactory internal consistency among measurement items.

Composite reliability (CR) was also assessed, with all constructs exceeding the recommended threshold of 0.80. This provides additional evidence that the measurement items consistently represent their respective constructs. Convergent validity was evaluated using average variance extracted (AVE), with all constructs achieving values above the recommended minimum threshold of 0.50, indicating that the constructs explained a sufficient proportion of variance in their indicators.

Content validity was established through expert review and pilot testing. The questionnaire was reviewed by professionals with expertise in accounting systems, digital technologies, and research methodology to ensure that the items adequately captured the intended concepts. A pilot test involving 20 respondents was conducted to evaluate item clarity, relevance, and reliability before the main data collection.

Potential common method bias was assessed using Harman's single-factor test. The first factor accounted for 27.4% of the total variance, which is below the commonly applied threshold of 50%, suggesting that common method bias was unlikely to substantially influence the findings. In addition, procedural measures were applied during data collection, including respondent anonymity, confidentiality assurances, and separation of measurement sections within the questionnaire.

Overall, the reliability and validity assessment provides support for the suitability of the measurement instruments used in examining the relationships among AI adoption, analytics maturity, and accounting system performance efficiency.

Ethical Considerations

Ethical standards were maintained throughout the research process to protect participants' rights and ensure responsible data handling. Ethical approval for the study was obtained from the relevant institutional review body (UNILAG/REC/2025/042) before data collection commenced.

Participation was voluntary, and all respondents were informed about the purpose of the study, the nature of their involvement, and their right to withdraw at any stage without consequence. Informed consent was obtained from all participants before questionnaire completion.

To protect confidentiality, no personally identifiable information was collected. Responses were anonymized and used exclusively for academic research purposes. Data were securely managed and analyzed in aggregated form to prevent identification of individual respondents or organizations.

The study also followed principles of research integrity, including accurate reporting of findings, transparent description of methods, and appropriate acknowledgment of previous scholarly contributions through referencing.

Mediation Analysis Approach

Mediation analysis was conducted to examine whether analytics maturity provides an indirect statistical pathway through which AI adoption is associated with accounting system performance efficiency. The analysis was based on the assumption that AI adoption represents a technological capability, while analytics maturity represents an organizational capability that may explain differences in performance outcomes among organizations using AI-enabled accounting systems.

The mediation model was tested using the PROCESS macro for SPSS (Model 4) developed by Hayes [10]. A bootstrap procedure with 5,000 resamples was applied to estimate the indirect association and generate bias-corrected confidence intervals. The indirect association was considered statistically significant when the confidence interval did not include zero.

The analytical model was specified as:

Performance Efficiency = c′(AI Adoption) + b(DAMI) + Control Variables + ε

Where:

- c′ represents the direct statistical association between AI adoption and performance efficiency after accounting for analytics maturity.
- b represents the statistical association between analytics maturity and performance efficiency.

The indirect association (a × b) represents the pathway through which AI adoption is statistically associated with performance efficiency through analytics maturity

Control variables included organization size, sector, and respondent experience [11-13].

Additional diagnostic tests were conducted to assess model suitability. Multicollinearity was examined using variance inflation factor (VIF) values, which ranged from 1.21 to 1.58 and remained below the recommended threshold of 5. Autocorrelation was assessed using the Durbin–Watson statistic (1.94), indicating acceptable residual independence.

A robustness assessment was conducted using bootstrapped regression procedures with 1,000 iterations. The results produced comparable coefficient estimates, providing additional confidence in the stability of the observed statistical associations.

Because the study uses a cross-sectional observational design, mediation findings are interpreted as indirect statistical associations rather than evidence of causal mechanisms. The analysis therefore identifies patterns consistent with an explanatory pathway while acknowledging the limitations of causal inference [14-15].

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RESULTS

Demographic Profile

Variable	Category	Frequency	Percentage
Gender	Male	175	58.3%
	Female	125	41.7%
Age	26–45 years	210	70.7%
Experience	5–10 years	225	75.0%
Sector	Banking	95	29.3%
	Manufacturing	88	28.7%
	Telecom	60	20.0%
	Public	57	19.0%

Table 3: Demographic Profile (N = 300)

The demographic distribution indicates that the respondents possessed relevant professional experience and organizational exposure for evaluating AI-enabled accounting systems. The sample consisted of 58.3% male and 41.7% female respondents, indicating representation from both groups within the accounting and finance professional population. The majority of respondents were within the 26–45 age category (70.7%), suggesting that most participants were professionals with active involvement in contemporary accounting practices and digital technology adoption [16].

In terms of professional experience, 75.0% of respondents reported between five and ten years of experience, indicating that participants had sufficient familiarity with accounting processes and organizational systems. The sector distribution shows representation across banking, manufacturing, telecommunications, and public sector organizations, allowing the study to capture perspectives from different institutional environments where accounting information systems and digital transformation initiatives are increasingly relevant.

Overall, the demographic profile suggests that respondents were appropriately positioned to provide informed assessments of AI adoption, analytics maturity, and accounting system performance efficiency [17].

Descriptive Statistics

Indicator	Mean	SD	% Agree
Real-time analytics usage	4.25	0.65	86.0%
Cloud-based accounting integration	4.18	0.70	84.3%
AI-driven reporting systems	4.20	0.68	85.0%
Predictive analytics usage	4.10	0.72	81.70%
Overall AI adoption (composite)	4.18	0.69	84.30%

Table 4: AI Adoption and DAMI Index Dimensions

The descriptive results indicate a relatively high level of AI adoption among the sampled organizations. The overall AI adoption score (Mean = 4.18, SD = 0.69) suggests that respondents generally reported substantial use of AI-enabled accounting technologies. Real-time analytics usage recorded the highest agreement level (86.0%), indicating that organizations are increasingly utilizing AI-supported tools to improve access to timely financial information. Similarly, AI-driven reporting systems and cloud-based accounting integration showed high levels of adoption, suggesting that AI implementation is extending beyond isolated applications toward broader accounting system integration.

The findings also indicate that predictive analytics usage, although slightly lower than other indicators, remains relatively strong (81.7% agreement). This may suggest that while organizations have adopted AI-supported reporting and analytical tools, more advanced capabilities such as predictive modelling may require further development in terms of data infrastructure, technical skills, and governance readiness. Overall, the descriptive findings demonstrate that AI adoption exists alongside varying levels of analytical capability within the sampled organizations [18].

Indicator	Mean	SD	% Agree
Faster reporting cycles	4.30	0.64	88.0%
Improved decision accuracy	4.22	0.67	86.0%
Real-time responsiveness	4.19	0.69	84.7%

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Reduced processing delays	4.25	0.66	87.0%
Overall performance efficiency (composite)	4.24	0.68	86.4%

Table 5: Performance Efficiency Outcomes

The performance efficiency results demonstrate positive perceptions regarding the outcomes associated with AI-enabled accounting systems. The overall performance efficiency score (Mean = 4.24, SD = 0.68) indicates that respondents generally perceived improvements in accounting operations following technology adoption. Faster reporting cycles recorded the highest agreement level (88.0%), suggesting that AI-enabled systems may support quicker processing and availability of financial information.

Improved decision accuracy and reduced processing delays also recorded high agreement levels, indicating that AI adoption is associated with enhanced operational responsiveness and decision-support capabilities. These findings provide initial descriptive evidence of a relationship between AI-enabled accounting practices and perceived efficiency improvements, which is further examined through regression and mediation analysis.

Constraint	% of respondents reporting	Rank
Data interoperability issues	86.2%	1
Cloud latency and integration failure	83.5%	2
API incompatibility across systems	81.7%	3
Algorithm transparency and explainability gaps	79.8%	4
Data governance fragmentation	77.4%	5

Table 6: Reported Constraints

Despite the reported benefits of AI adoption, respondents identified several implementation constraints affecting AI-enabled accounting transformation. Data interoperability issues were the most frequently reported challenge (86.2%), indicating difficulties associated with integrating AI applications with existing accounting and information systems. Cloud latency and integration failures (83.5%) and API incompatibility (81.7%) further highlight infrastructure and system connectivity challenges.

Algorithm transparency gaps (79.8%) and data governance fragmentation (77.4%) suggest that responsible AI implementation remains an important consideration. These findings indicate that achieving higher levels of AI-enabled accounting performance requires not only technological adoption but also investment in integration capabilities, governance structures, and organizational readiness.

Direct Associations (Regression)

Dependent	Variable	β	SE	t	p	R^2	Adj. R^2
Real-time analytics capability	0.48	0.047	10.21	<.001	0.23	0.22	
Cloud integration efficiency	0.45	0.046	9.88	<.001	0.21	0.20	
Data-driven decision responsiveness	0.44	0.046	9.52	<.001	0.20	0.19	
Overall DAMI index	0.47	0.047	10.0	<.001	0.22	0.21	

Table 7: Direct Associations of AI Adoption with DAMI Index Dimensions

The regression results provide evidence of statistically significant positive associations between AI adoption and the dimensions of analytics maturity. AI adoption was positively associated with real-time analytics capability (β = 0.48, p < .001), indicating that organizations with higher levels of AI adoption also reported stronger capabilities for accessing and processing financial information in real time.

Similarly, AI adoption demonstrated significant positive associations with cloud integration efficiency (β = 0.45, p < .001) and data-driven decision responsiveness (β = 0.44, p < .001). These findings suggest that AI-enabled accounting environments are associated with improved system integration and enhanced organizational ability to respond to financial information requirements [19].

The overall DAMI index also showed a significant positive association with AI adoption (β = 0.47, p < .001), explaining 22% of the variance in analytics maturity within the model. This finding indicates that AI adoption is associated not only with the availability of AI technologies but also with the

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development of broader analytical capabilities required for effective technology utilization.

The results support H_1, H_2, H_3, and H_4. However, given the cross-sectional design of the study, these relationships are interpreted as statistical associations rather than evidence of causal effects. The findings provide empirical support for the view that AI adoption and analytics maturity are interconnected components of AI-enabled accounting transformation.

Note: All models control for organization size, sector, and respondent experience.

Mediation Analysis

Association	Coefficient	SE	95%	CI (LL, UL)	p
Direct association	(c′)	0.36	0.052	[0.26, 0.46]	<.001
Indirect association	(a × b)	0.32	0.041	0.24, 0.40	<.001
Total association	(c)	0.68	0.048	0.59, 0.77	<.001

Table 8: Mediation of DAMI Index on AI Adoption → Performance Efficiency

The mediation analysis examined whether analytics maturity provides an indirect statistical pathway linking AI adoption with accounting system performance efficiency. The results indicate that AI adoption has a significant direct association with performance efficiency after accounting for analytics maturity ($\beta = 0.36$, $p < .001$). This suggests that AI adoption remains statistically associated with improved accounting performance outcomes even when organizational analytics capability is considered [20].

The indirect association through the DAMI index was also statistically significant ($a \times b = 0.32$, 95% CI [0.24, 0.40], $p < .001$). Since the confidence interval does not include zero, the indirect pathway is supported within the sample model. The reduction from the total association ($\beta = 0.68$) to the direct association ($\beta = 0.36$) after including DAMI provides evidence consistent with a partial indirect association.

These findings suggest that analytics maturity represents an important associated capability within AI-enabled accounting environments. AI adoption alone may provide access to advanced technological tools, but organizations with stronger analytical capabilities may be better positioned to convert AI-generated information into improved reporting efficiency, decision support, and operational responsiveness.

The mediation results provide empirical support for the Resource-Based View perspective, which emphasizes that organizational value is generated not only from technological resources but also from complementary internal capabilities. In this context, analytics maturity represents a capability that may strengthen the relationship between AI adoption and accounting system performance efficiency.

The overall model explained 68% of the variance in performance efficiency within the sample ($R^2 = 0.68$; Adjusted $R^2 = 0.67$). While this indicates substantial explanatory power within the observed data, the results should not be interpreted as causal effects due to the cross-sectional nature of the study [21].

The robustness assessment using bootstrapped regression produced similar estimates (direct association = 0.35; indirect association = 0.33; $p < .001$), supporting the consistency of the observed statistical relationships.

Hypothesis Testing Summary

Hypothesis	Path	β 95%	CI	Supported
H_1 AI	Real-time capability	0.48	[0.39, 0.57]	Yes
H_2 AI	Cloud integration	0.45	[0.36, 0.54]	Yes
H_3 AI	Decision responsiveness	0.44	[0.35, 0.53]	Yes
H_4 AI	DAMI index	0.47	[0.38, 0.56]	Yes
H_5	Indirect association via DAMI	0.32	[0.24, 0.40]	Yes

Table 9: Hypothesis Testing Summary

The hypothesis testing results provide overall support for the proposed research model. The findings indicate that AI adoption is positively associated with multiple dimensions of analytics capability, including real-time analytics capability (H_1), cloud integration efficiency (H_2), data-driven decision responsiveness (H_3), and overall analytics maturity (H_4). These results suggest that organizations adopting AI-enabled accounting technologies also demonstrate stronger analytical capabilities within their accounting environments [22].

The mediation hypothesis (H_5) was also supported, as analytics maturity demonstrated a statistically significant indirect association between AI adoption and performance efficiency. This finding indicates that analytics maturity may serve as an associated mechanism through which organizations derive greater value from AI-enabled accounting systems.

Collectively, the findings support the proposed framework by demonstrating that AI adoption and analytics maturity are interconnected elements of accounting system transformation. However, the results represent statistical associations observed within the sampled organizations and should be interpreted within the limitations of the cross-sectional research design.

DISCUSSION

This study examined the relationship between Artificial Intelligence (AI) adoption, analytics maturity, and performance

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efficiency in accounting systems within emerging economy organizations. The findings provide evidence that AI adoption is positively associated with accounting system performance efficiency and that analytics maturity represents an important associated capability within this relationship. These findings contribute to the growing discussion on digital transformation in accounting by demonstrating that technological adoption and organizational analytical capability should be considered together when examining AI-enabled accounting outcomes.

AI Adoption and Accounting System Performance Efficiency

The results indicate a significant positive association between AI adoption and performance efficiency ($\beta = 0.36$, $p < .001$). This suggests that organizations implementing AI-enabled accounting technologies tend to report improved outcomes related to reporting speed, decision support, operational responsiveness, and processing efficiency. The finding is consistent with previous research highlighting the potential of AI technologies to automate accounting activities, enhance information processing, and support more timely financial analysis [23].

The observed relationship can be explained through the Technology Acceptance Model (TAM), which emphasizes that perceived usefulness influences technology utilization. When accounting professionals recognize AI-enabled tools as valuable for improving accounting processes, adoption and effective use are more likely to occur. However, the findings should not be interpreted as evidence that AI adoption alone guarantees improved performance, as organizational capabilities and implementation conditions remain important factors.

Within emerging economies, where organizations may face infrastructure limitations and resource constraints, the association between AI adoption and performance efficiency highlights the importance of developing appropriate digital foundations. AI technologies may provide opportunities for accounting transformation, but their effectiveness depends on the availability of supporting systems, skilled personnel, and governance structures.

Analytics Maturity as an Associated Mechanism

The mediation analysis provides evidence that analytics maturity represents an important associated mechanism within the relationship between AI adoption and accounting system performance efficiency. The significant indirect association through the DAMI index ($a \times b = 0.32$, 95% CI [0.24, 0.40]) indicates that organizations may achieve greater performance benefits from AI adoption when they possess stronger analytical capabilities.

This finding extends previous discussions on digital transformation in accounting by suggesting that technology adoption alone may not fully explain differences in organizational outcomes. AI provides advanced computational capabilities, but the ability to generate value from these capabilities depends on complementary organizational resources, including data integration, analytical skills, governance practices, and decision-support processes.

The result is consistent with the Resource-Based View (RBV), which emphasizes that sustainable organizational value arises from the effective combination of valuable resources and internal capabilities. In this context, AI adoption represents a technological resource, while analytics maturity represents an organizational capability that enables the effective utilization of AI-generated information.

The findings also provide support for distinguishing between AI adoption and analytics maturity as separate but related constructs. An organization may implement AI technologies without achieving a high level of analytical maturity if it lacks appropriate data infrastructure, integration capacity, or governance mechanisms. Therefore, developing analytics maturity may be an important step in converting AI investments into improved accounting system efficiency.

From a practical perspective, organizations seeking to improve AI-enabled accounting outcomes should not focus exclusively on acquiring AI tools. Investment in data quality management, employee analytical competencies, system integration capabilities, and responsible AI governance may be equally important for achieving higher levels of analytics maturity.

Implementation Constraints and Emerging Economy Context

Although the findings demonstrate positive associations between AI adoption, analytics maturity, and accounting system performance efficiency, respondents also identified several barriers affecting AI-enabled accounting transformation. The most frequently reported challenge was data interoperability (86.2%), followed by cloud latency and integration limitations (83.5%) and API incompatibility across systems (81.7%). These findings indicate that technical integration remains a major consideration for organizations attempting to implement AI within existing accounting environments.

The reported interoperability challenges suggest that organizations may experience difficulties connecting AI applications with existing accounting information systems, enterprise platforms, and fragmented data sources. Without effective integration mechanisms, organizations may be unable to achieve the full analytical benefits associated with AI adoption. This highlights the importance of developing standardized data structures, improved system compatibility, and stronger digital infrastructure.

Algorithm transparency concerns (79.8%) and data governance fragmentation (77.4%) further demonstrate that AI implementation involves organizational and governance challenges beyond technical adoption. Accounting systems require reliable, explainable, and accountable analytical processes because financial decisions often involve regulatory compliance, auditability, and professional judgment. Therefore, responsible AI practices, including transparency mechanisms and appropriate governance frameworks, are essential components of AI-enabled accounting transformation.

These findings are particularly relevant in emerging economy contexts, where organizations may face unequal access to digital infrastructure, limited technical expertise, and evolving regulatory environments. While AI adoption provides opportunities for improving accounting efficiency, successful

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implementation requires coordinated development of technological infrastructure, human capabilities, and governance arrangements.

Theoretical Contributions

This study contributes to the literature on AI-enabled accounting transformation by integrating technological adoption and organizational capability perspectives. While previous research has examined AI adoption in accounting contexts, this study extends existing discussions by examining analytics maturity as an associated capability that links AI adoption with performance efficiency outcomes.

First, the findings provide support for the relevance of the Technology Acceptance Model (TAM) in understanding AI adoption within accounting environments. The positive associations between AI adoption and analytics-related capabilities suggest that when accounting professionals and organizations adopt AI technologies, these tools may support improved information processing, analytical activities, and decision-support processes. However, the findings also indicate that adoption alone does not fully explain performance outcomes.

Second, the study extends the application of the Resource-Based View (RBV) by highlighting analytics maturity as an organizational capability associated with effective AI utilization. Consistent with RBV, technological resources may generate greater organizational value when combined with complementary capabilities such as data management, analytical expertise, system integration, and governance structures. The significant indirect association through DAMI provides empirical support for considering analytics maturity as an important capability within AI-enabled accounting systems.

Third, the study contributes contextually by providing empirical evidence from an emerging economy setting. Much of the existing AI and accounting literature has focused on developed economies with more advanced digital infrastructure. By examining Nigerian organizations, this study provides insight into how AI adoption and analytics capability development occur within environments characterized by infrastructure constraints and evolving digital transformation processes.

Finally, the study contributes methodologically through the application of the Data Analytics Maturity Indicators (DAMI) as a composite measurement approach for assessing analytics maturity within accounting systems. While further validation is required across different contexts, DAMI provides an exploratory approach for examining the analytical capabilities that support AI-enabled accounting transformation.

CONCLUSION AND IMPLICATIONS

This study examined the association between Artificial Intelligence (AI) adoption and performance efficiency in accounting systems of emerging economy organizations, with analytics maturity examined as an indirect mechanism. Using the Technology Acceptance Model (TAM) and Resource-Based View (RBV) as supporting perspectives, the study provides empirical evidence that AI adoption is positively associated with accounting system performance efficiency and that analytics maturity represents an important organizational capability within AI-enabled accounting environments.

The findings indicate that organizations with higher levels of AI adoption report stronger analytics capabilities, including real-time analytics capability, cloud integration efficiency, and data-driven decision responsiveness. Furthermore, the significant indirect association through the DAMI index suggests that analytics maturity may help explain how organizations derive value from AI-enabled accounting technologies. However, because the study is based on cross-sectional observational data, the findings are interpreted as statistical associations rather than causal relationships.

The study contributes to the growing literature on digital transformation in accounting by demonstrating that successful AI implementation involves more than technological acquisition. Organizations may require complementary capabilities related to data management, system integration, analytical skills, and governance practices to maximize the value associated with AI-enabled accounting systems.

Theoretical Implications

The study provides theoretical implications for understanding AI adoption and analytics capability development in accounting contexts. From a TAM perspective, the findings reinforce the importance of effective adoption and utilization of AI technologies by accounting professionals. The observed relationships suggest that perceived usefulness and organizational application of AI tools are relevant considerations in digital accounting transformation.

From an RBV perspective, the findings highlight analytics maturity as a potential organizational capability that supports the effective utilization of AI resources. The results suggest that technological resources may be associated with improved outcomes when combined with internal capabilities that enable organizations to transform data into actionable insights.

Practical and Policy Implications

For organizational managers, the findings suggest that AI adoption strategies should extend beyond technology acquisition. Organizations may benefit from investing in analytics capability development, including data governance frameworks, employee training, system integration capacity, and responsible AI practices.

For professional accounting bodies, including ICAN and related institutions, the findings highlight the importance of strengthening professional development programmes in areas such as data analytics, cloud accounting systems, AI literacy, and digital governance.

For policymakers, the findings may inform discussions regarding digital infrastructure development, interoperability standards, AI governance frameworks, and capacity-building initiatives that support responsible AI adoption within accounting and financial systems.

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The DAMI index may also provide organizations with an exploratory approach for assessing analytics maturity levels and identifying capability gaps that require further development.

Exploratory Indicators for Analytics Maturity Assessment

To support practical interpretation of analytics maturity, this study proposes exploratory indicators aligned with progressive stages of analytical capability development. These indicators are not presented as universal maturity standards but as illustrative assessment dimensions that organizations may consider when evaluating their analytics development journey.

The proposed indicators reflect the progression from basic data management capabilities toward more advanced analytical and autonomous capabilities. Organizations may adapt these indicators according to their operational context, industry requirements, regulatory environment, and technological readiness.

Proposed maturity level	Indicator	Suggested exploratory assessment target	Suggested review frequency
Descriptive	Data completeness and availability	≥95% data completeness	Monthly
Diagnostic	Automated variance and pattern detection capability	≥80% detection capability	Quarterly
Predictive	Forecasting capability and accuracy improvement	≥30% improvement target	Quarterly
Prescriptive	Real-time analytical dashboard availability	≥90% of key performance indicators monitored	Monthly
Autonomous	Automated exception identification and handling capability	≥60% of exceptions processed automatically	Quarterly

Table 10: Proposed Analytics Maturity Levels, Indicators, Assessment Targets, and Review Frequency

These indicators provide a practical reference for organizations seeking to evaluate analytics capability progression. However, further empirical validation is required before these indicators can be considered formal maturity benchmarks across different industries or emerging economy contexts.

LIMITATIONS AND FUTURE RESEARCH

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional research design limits the ability to examine changes in AI adoption, analytics maturity, and accounting system performance over time. Although the study identifies significant statistical associations among the variables, the findings should not be interpreted as evidence of causal relationships.

Second, the study focused on organizations operating in Nigeria, with data collected from selected locations including Lagos, Abuja, Port Harcourt, and Ibadan. While these locations represent important business and administrative centres, the findings may not be directly generalizable to all organizations within Nigeria or other emerging economies with different technological, institutional, and regulatory environments.

Third, the study examined organizations that had already adopted AI-enabled accounting or analytics tools. Consequently, the findings primarily reflect the experiences of AI-active organizations and may not capture the challenges or characteristics of organizations that have not yet initiated AI adoption.

Fourth, the measurement of analytics maturity through the Data Analytics Maturity Indicators (DAMI) represents a study-specific composite index developed for the research context. Although the index demonstrated acceptable reliability, further validation across different sectors, countries, and organizational settings is required to establish broader applicability.

Finally, the study relied primarily on self-reported responses from accounting and finance professionals. Although reliability and validity assessments were conducted, future research may incorporate objective organizational performance indicators, system usage data, or multiple respondent groups to provide additional evidence.

Future Research

Future studies may extend this research by adopting longitudinal research designs to examine how AI adoption and analytics maturity develop over time and how these changes relate to accounting system outcomes. Longitudinal approaches may provide deeper insight into the sustainability of AI-enabled transformation initiatives.

Comparative studies across multiple emerging economies could further examine whether institutional, infrastructural, and regulatory differences influence the relationship between AI adoption, analytics maturity, and performance efficiency.

Future research may also further validate and refine the DAMI index using larger samples, confirmatory factor analysis, and cross-industry comparisons. Such validation would strengthen understanding of analytics maturity as an organizational capability.

Qualitative studies involving accounting professionals, technology managers, and policymakers could provide additional insight into implementation challenges, particularly

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issues related to interoperability, API integration, data governance, and responsible AI deployment.

Finally, future research may examine additional factors that influence AI-enabled accounting outcomes, including organizational culture, employee digital skills, cybersecurity readiness, regulatory compliance, and AI governance maturity.

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