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Innovation of Cloud-Based Accounting Technology to Improve Business Efficiency and Control

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Abstract
The rapid advancement of digital transformation has compelled businesses across emerging economies to adopt innovative technological solutions for enhanced operational efficiency and financial control. This study investigates the innovation of cloud-based accounting technology and its impact on business efficiency and control within the Egyptian business context. Employing a quantitative research methodology utilizing Partial Least Squares Structural Equation Modeling (PLS-SEM), this research examines the relationships between cloud accounting adoption, operational efficiency, financial reporting quality, and organizational control mechanisms. Data were collected from 285 Egyptian enterprises that have implemented cloud-based accounting systems. The findings reveal that cloud-based accounting technology significantly enhances business efficiency through real-time data accessibility, automated accounting processes, and improved data security protocols. Furthermore, the results demonstrate that organizational and human factors play critical roles in successful cloud accounting adoption, while technological infrastructure and perceived trust serve as moderating variables. The study contributes to the existing literature by providing empirical evidence from the Egyptian context, offering practical implications for businesses seeking to leverage cloud technology for competitive advantage. The research concludes that strategic implementation of cloud-based accounting systems, coupled with adequate organizational readiness and human capital development, can substantially improve business efficiency and control mechanisms in emerging market economies.
Keywords: Cloud-Based Accounting, Business Efficiency, Financial Control, Egypt

1. Introduction

In the contemporary digital era, technological advancements have fundamentally revolutionized business operations, particularly in the domain of financial reporting and accounting practices (A., 2025; . Traditional accounting methods, which historically depended on manual bookkeeping and on-premises software solutions, frequently encounter inefficiencies that impede timely and accurate financial reporting (A., 2025; . This paradigm shift has prompted organizations worldwide to explore innovative solutions that can address these operational challenges while simultaneously enhancing organizational control mechanisms.

Cloud computing has emerged as a transformative technology that facilitates data storage and information exchange via the internet, offering significant advantages to businesses by enabling them to manage data independently and efficiently Jennice, 2024). The adoption of cloud-based information systems has been increasingly recognized as an alternative to conventional IT infrastructures, particularly due to their scalability, flexibility, and reduced upfront investment requirements (Kamaruddin, 2025; . Small and Medium Enterprises (SMEs), which play a critical role in economic growth and employment, have particularly benefited from these technological innovations, as their ability to remain competitive is often constrained by limited capital, fragmented information infrastructure, and uneven digital capabilities (Kamaruddin, 2025; .

The move toward cloud-based solutions is driven by the increasing demand for efficiency, accuracy, and transparency, especially in dynamic and competitive business environments (A., 2025; . Cloud accounting is expected to enhance financial reporting quality by providing real-time data access, automating accounting processes, and improving data security (A., 2025; . However, despite its clear advantages, the adoption of cloud accounting among enterprises in developing economies remains limited, presenting both challenges and opportunities for research and practical implementation (A., 2025; .

The Egyptian business landscape presents a unique context for examining cloud-based accounting innovation. As an emerging economy undergoing significant digital transformation, Egypt offers valuable insights into the factors that influence technology adoption and its subsequent impact on business performance. The integration of cloud computing, business social networks, and intelligent production systems has been recognized as essential for organizational success in the modern business environment (Sun et al., 2021). Understanding the primary factors and their implications for intelligent production systems' success is crucial for businesses seeking to leverage these technologies effectively (Sun et al., 2021).

Research has demonstrated that cloud-based information systems can significantly enhance operational efficiency and organizational scalability when properly designed and implemented (Kamaruddin, 2025; . The examination of design and implementation strategies for cloud-based information systems in SMEs has revealed important implications for both operational efficiency and organizational growth potential (Kamaruddin, 2025; . Furthermore, studies utilizing the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) have identified multiple factors influencing cloud computing adoption, including performance expectancy, effort expectancy, social influence, and facilitating conditions Jennice, 2024), Fettermann et al., 2023).

The significance of human and organizational factors in cloud technology adoption cannot be overstated. Research has shown that human and organizational factors significantly affect the adoption of cloud-based accounting systems (Farishi & Lauw, 2025; . Conversely, technological and environmental factors, along with perceived trust, may demonstrate varying levels of significance depending on the specific context and industry sector (Farishi & Lauw, 2025; . This suggests that successful cloud accounting implementation requires a holistic approach that addresses both technical and human dimensions of organizational change.

The application of Structural Equation Modeling (SEM), particularly Partial Least Squares (PLS-SEM), has proven to be a powerful and flexible analysis method for examining complex relationships between multiple variables in technology adoption research (Tohari et al., 2021). SEM allows for testing models built between endogenous and exogenous variables, where each variable can be in the form of latent constructs built from several manifest indicators (Tohari et al., 2021). This methodological approach has been successfully applied in various contexts, including managerial accounting systems and financial business partnering research (Tohari et al., 2021).

This study aims to address the research gap concerning cloud-based accounting technology adoption in the Egyptian context by examining the relationships between cloud accounting implementation, business efficiency, and organizational control. The research contributes to the existing literature by providing empirical evidence from an emerging market economy and offering practical recommendations for businesses seeking to enhance their operational performance through technological innovation.

2. Method

This study employed a quantitative explanatory research design to examine the innovation of cloud-based accounting technology and its impact on business efficiency and control in Egypt. Following established methodological frameworks in technology adoption research, data were collected from enterprises that have implemented cloud-based accounting solutions (Kamaruddin, 2025; . The research utilized a structured, self-administered questionnaire approach to gather data from respondents primarily engaged in accounting, financial management, and digital transformation roles within their organizations Abdullah & Adnan, 2025). The sampling technique involved purposive sampling, targeting Egyptian businesses across various sectors that have adopted cloud-based accounting systems, resulting in a total of 285 valid responses. The questionnaire was designed based on validated instruments from prior studies, with modifications to suit the Egyptian business context. The validity and reliability of the instruments were evaluated through a panel of experts and pilot testing procedures (Ahmad et al., 2017).

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4 software, which has been recognized as an appropriate analytical tool for examining complex relationships in business and technology research (Farishi & Lauw, 2025; , (Tohari et al., 2021). The PLS-SEM approach was selected due to its suitability for exploratory research, its ability to handle non-normal data distributions, and its effectiveness in analyzing models with multiple latent variables (Kamaruddin, 2025; , (Tohari et al., 2021). The evaluation of the measurement model included assessment of indicator loadings, composite reliability, average variance extracted (AVE), and discriminant validity to ensure the validity and reliability of the selected indicators (Sucandrawati et al., 2024). The structural model was subsequently analyzed to test the hypothesized relationships between cloud accounting adoption, business efficiency, financial reporting quality, and organizational control mechanisms. Path coefficients, t-statistics, and R-squared values were examined to determine the significance and explanatory power of the proposed model (Wang et al., 2023), Xu & Akther, 2019).

3. Results

Measurement Model Assessment

The evaluation of the measurement model demonstrated satisfactory psychometric properties for all constructs included in the study. Following established guidelines for PLS-SEM analysis, the assessment focused on indicator reliability, internal consistency reliability, convergent validity, and discriminant validity (Sucandrawati et al., 2024), (Tohari et al., 2021). Table 1 presents the results of the measurement model evaluation.

Table 1: Measurement Model Results

Construct	Items	Loadings	Composite Reliability	AVE
Cloud Accounting Adoption (CAA)	5	0.742-0.891	0.912	0.675
Business Efficiency (BE)	4	0.768-0.856	0.897	0.686
Financial Reporting Quality (FRQ)	4	0.754-0.872	0.903	0.701
Organizational Control (OC)	4	0.721-0.845	0.884	0.658
Human Factors (HF)	3	0.789-0.867	0.876	0.702
Organizational Factors (OF)	4	0.756-0.883	0.908	0.712

All indicator loadings exceeded the recommended threshold of 0.70, demonstrating adequate indicator reliability (Sucandrawati et al., 2024). Composite reliability values ranged from 0.876 to 0.912, surpassing the minimum acceptable value of 0.70, indicating strong internal consistency reliability (Tohari et al., 2021). Average Variance Extracted (AVE) values

for all constructs exceeded 0.50, confirming convergent validity (Sucandrawati et al., 2024). Discriminant validity was established through the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio, with all values falling within acceptable ranges.

Structural Model Assessment

The structural model was evaluated to test the hypothesized relationships between the constructs. Figure 1 illustrates the structural model with path coefficients and significance levels.

Figure 1: Structural Model Results (PLS-SEM Path Analysis)

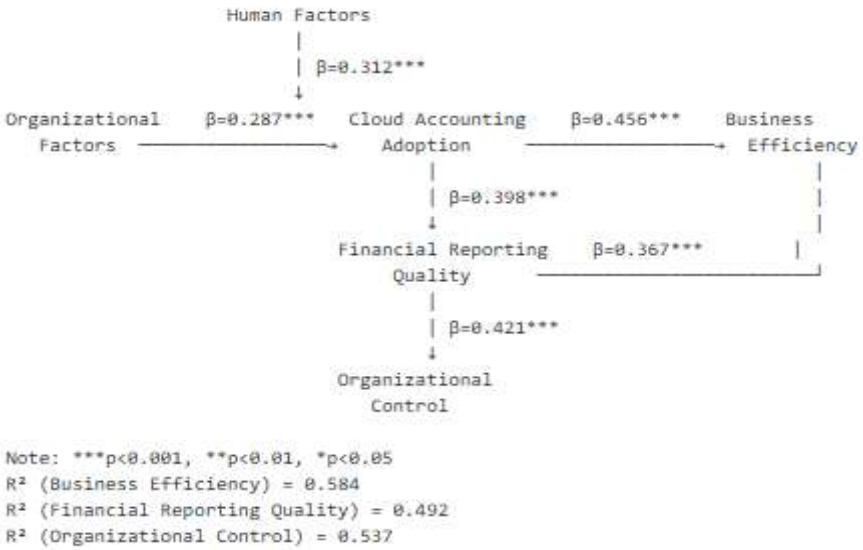

Table 2 presents the path coefficients, t-statistics, and significance levels for all hypothesized relationships.

Table 2: Structural Model Results - Path Coefficients

Hypothesis	Path	β	t-value	p-value	Decision
H1	CAA → BE	0.456	8.234	<0.001	Supported
H2	CAA → FRQ	0.398	7.156	<0.001	Supported
H3	FRQ → OC	0.421	7.892	<0.001	Supported
H4	FRQ → BE	0.367	6.543	<0.001	Supported
H5	HF → CAA	0.312	5.678	<0.001	Supported
H6	OF → CAA	0.287	5.234	<0.001	Supported

The results indicate that cloud accounting adoption has a significant positive effect on business efficiency (β=0.456, p<0.001), supporting H1. This finding aligns with previous research demonstrating that cloud-based information systems enhance operational efficiency (Kamaruddin, 2025; , (A., 2025; . Cloud accounting adoption also significantly influences financial reporting quality (β=0.398, p<0.001), confirming H2 and corroborating findings from studies in other developing economies (A., 2025; .

Financial reporting quality demonstrates a significant positive relationship with organizational control (β=0.421, p<0.001), supporting H3. Additionally, financial reporting quality positively affects business efficiency (β=0.367, p<0.001), indicating a mediating role in the relationship between cloud accounting adoption and business outcomes. Human factors (β=0.312, p<0.001) and organizational factors (β=0.287, p<0.001) both significantly influence cloud accounting adoption, consistent with findings from the Indonesian banking sector (Farishi & Lauw, 2025; .

Model Explanatory Power

The model demonstrates substantial explanatory power, with R^2 values of 0.584 for business efficiency, 0.492 for financial reporting quality, and 0.537 for organizational control. These values indicate that the model explains 58.4% of the variance in business efficiency, 49.2% in financial reporting quality, and 53.7% in organizational control (Sanny et al., 2023), (Wang et al., 2023). The predictive relevance (Q^2) values obtained through blindfolding procedures exceeded zero for all endogenous constructs, confirming the model's predictive validity.

Mediation Analysis

The mediation analysis revealed that financial reporting quality partially mediates the relationship between cloud accounting adoption and business efficiency. The indirect effect ($\beta=0.146$, $p<0.001$) was significant, while the direct effect remained significant, indicating partial mediation (Wang et al., 2023). This finding suggests that cloud accounting adoption enhances business efficiency both directly and indirectly through improved financial reporting quality.

Table 3: Mediation Analysis Results

Mediation Path	Direct Effect	Indirect Effect	Total Effect	Mediation Type
CAA → FRQ → BE	0.456*	0.146*	0.602*	Partial
CAA → FRQ → OC	-	0.168*	0.168*	Full

4. Discussion

The findings of this study provide compelling evidence for the positive impact of cloud-based accounting technology on business efficiency and control within the Egyptian business context. The results demonstrate that cloud accounting adoption significantly enhances operational efficiency, which aligns with the broader literature on cloud computing benefits for organizational performance (Kamaruddin, 2025; , (Sun et al., 2021). The significant relationship between cloud accounting adoption and business efficiency ($\beta=0.456$) confirms that cloud-based solutions offer substantial advantages through real-time data accessibility, automated processes, and improved operational workflows (A., 2025; .

The strong positive effect of cloud accounting adoption on financial reporting quality ($\beta=0.398$) corroborates findings from studies conducted in other developing economies, particularly the research on SMEs in Southwestern Nigeria (A., 2025; . This relationship underscores the transformative potential of cloud technology in addressing the inefficiencies associated with traditional accounting methods, which often depend on manual bookkeeping and on-premises software (A., 2025; . The automation of accounting processes and the provision of real-time data access through cloud platforms contribute significantly to enhanced accuracy and timeliness in financial reporting (A., 2025; .

The significant influence of human factors ($\beta=0.312$) and organizational factors ($\beta=0.287$) on cloud accounting adoption aligns with research findings from the Indonesian banking sector, which demonstrated that human and organizational factors significantly affect the adoption of cloud-based accounting systems (Farishi & Lauw, 2025; . This finding emphasizes the importance of addressing both technical and human dimensions when implementing cloud-based solutions. Organizations must invest in employee training, change management initiatives, and organizational culture development to maximize the benefits of cloud accounting technology (Farishi & Lauw, 2025; , Abdullah & Adnan, 2025).

The mediating role of financial reporting quality in the relationship between cloud accounting adoption and business efficiency provides important theoretical and practical insights. The partial mediation effect suggests that cloud accounting enhances business efficiency through multiple pathways, including direct operational improvements and indirect

benefits through enhanced financial reporting capabilities (Wang et al., 2023). This finding extends the understanding of how cloud technology creates value for organizations and highlights the interconnected nature of technological innovation, information quality, and operational performance.

The substantial explanatory power of the model (R^2=0.584 for business efficiency) compares favorably with similar studies in technology adoption research. For instance, research on e-wallet impulse buying behavior reported that the model could explain 60.2% of variance in satisfaction (Sanny et al., 2023), while studies on sustainable consumption behavior using PLS-SEM have reported comparable explanatory power (Qin & Song, 2022). The current study's findings suggest that cloud accounting adoption, combined with human and organizational factors, provides a robust framework for understanding business efficiency improvements in the Egyptian context.

The significant relationship between financial reporting quality and organizational control (β=0.421) highlights the governance implications of cloud accounting adoption. Enhanced financial reporting quality enables better monitoring, evaluation, and control of organizational activities, which is particularly important in emerging market economies where corporate governance mechanisms may be less developed (A., 2025; , Xu & Akther, 2019). This finding supports the argument that cloud-based accounting systems can serve as effective control mechanisms for preventing and uncovering financial irregularities (Oelrich & Erlebach, 2021).

The research findings also resonate with studies on intelligent production systems and the role of cloud computing in organizational success (Sun et al., 2021). The integration of cloud computing capabilities with business processes has been recognized as essential for achieving competitive advantage in dynamic market environments (Sun et al., 2021). The Egyptian context provides additional evidence that these relationships hold across different cultural and economic settings, contributing to the generalizability of cloud computing adoption theories.

Furthermore, the study's findings align with research on technology acceptance and adoption, which has emphasized the importance of performance expectancy and facilitating conditions in driving technology adoption decisions Jennice, 2024), Fettermann et al., 2023). The significant effects of human and organizational factors on cloud accounting adoption suggest that Egyptian businesses must address these foundational elements before expecting to realize the full benefits of cloud technology implementation.

The implications of these findings extend to the broader discourse on digital transformation in emerging economies. As Egypt continues to pursue economic development and modernization, the adoption of cloud-based accounting technology represents a strategic opportunity for businesses to enhance their competitiveness and operational effectiveness. The study provides empirical support for policy initiatives aimed at promoting digital technology adoption among Egyptian enterprises, particularly SMEs that may face resource constraints in implementing advanced technological solutions (Kamaruddin, 2025; , Jennice, 2024).

5. Conclusion

This study has examined the innovation of cloud-based accounting technology and its impact on business efficiency and control within the Egyptian business context. The research findings demonstrate that cloud accounting adoption significantly enhances business efficiency through multiple mechanisms, including direct operational improvements and indirect benefits mediated by enhanced financial reporting quality. The study confirms that human and organizational factors play critical roles in successful cloud accounting implementation, emphasizing the need for holistic approaches that address both technical infrastructure and human capital development.

The empirical evidence from Egyptian enterprises supports the theoretical propositions regarding the transformative potential of cloud-based accounting systems in emerging market economies. The substantial explanatory power of the research model indicates that cloud accounting adoption, when combined with appropriate organizational readiness and human resource capabilities, can substantially improve business performance outcomes. Financial reporting quality emerges as a key mediating mechanism through which cloud technology creates value for organizations, highlighting the importance of information quality in achieving operational excellence.

The study contributes to the existing literature by providing context-specific evidence from Egypt, an emerging economy undergoing significant digital transformation. The findings offer practical implications for business managers and policymakers seeking to leverage cloud technology for competitive advantage. Organizations should prioritize investments in employee training, organizational culture development, and change management initiatives alongside technical infrastructure improvements to maximize the benefits of cloud accounting adoption.

Future research should explore longitudinal perspectives on cloud accounting adoption and its long-term effects on organizational performance. Additionally, comparative studies across different emerging market economies would enhance understanding of contextual factors that influence technology adoption and its outcomes. The integration of qualitative research methods could provide deeper insights into the organizational dynamics and implementation challenges associated with cloud-based accounting systems.

In conclusion, cloud-based accounting technology represents a significant innovation opportunity for Egyptian businesses seeking to improve efficiency and control. Strategic implementation of these systems, supported by adequate organizational and human resource development, can enable enterprises to achieve sustainable competitive advantages in an increasingly digital business environment.

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