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RESEARCH ARTICLE

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## CLOUD COMPUTING ADOPTION AND ORGANIZATIONAL PERFORMANCE IN UGANDAN SMES

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### ABSTRACT

**Purpose:** This study aims to establish the effect of cloud computing adoption on organizational performance among small and medium enterprises (SMEs) in Uganda. **Design/methodology/approach:** Using a quantitative, cross-sectional survey design, data were gathered from 200 SME managers through a structured questionnaire. The analysis involved descriptive statistics, multiple regression, and confirmatory factor analysis (CFA) to test the hypothesized relationships. **Findings:** Empirical evidence indicates that cloud computing adoption significantly enhances organizational performance. Key determinants, such as perceived usefulness and top management support, drive these performance improvements, whereas security concerns exert a moderate negative influence. **Practical implications:** The findings provide a roadmap for Ugandan SMEs to leverage cloud-based services for cost reduction, operational agility, and improved competitiveness. The results can also inform policymakers when designing support initiatives for technology adoption. **Originality/value:** This paper contributes to emerging research on cloud computing adoption in developing economies by incorporating data from 2021–2025. The study's integrated model offers comprehensive guidelines for enhancing SME performance through strategic IT investments.

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## INTRODUCTION

Cloud computing has rapidly evolved into a transformative paradigm for delivering scalable IT services over the Internet. With its on-demand provisioning model and pay-as-you-go pricing, cloud computing presents significant opportunities for SMEs that typically face capital and resource constraints (Mkhize, Mokhothu, & Tshikhotho, 2024; Al-Sharafi *et al.*, 2023). In developing countries such as Uganda, the adoption of cloud computing is viewed as a strategic lever to enhance operational efficiency, reduce costs, and improve overall performance (Kalinaki & Tumwine, 2024; Uganda Communications Commission, 2023). This study investigates the impact of cloud computing adoption on organizational performance among Ugandan SMEs. By empirically testing the relationship, the research addresses a critical gap in the literature. The Technology–Organization–Environment (TOE) framework is used to evaluate both internal and external factors influencing technology adoption (Al-Sharafi *et al.*, 2023; Mkhize *et al.*, 2024).

### Literature Review

**Cloud computing benefits for SMEs:** Smith and Brown (2021) contend that cloud computing enables SMEs to bypass the heavy upfront costs associated with traditional IT infrastructure, arguing that this paradigm shift allows organizations to convert significant capital

expenditures into more manageable operational expenses. Kumar and Gupta (2020) add to the debate by asserting that this transition liberates financial resources, enabling SMEs to reallocate funds toward innovation and growth initiatives. In contrast, Chen *et al.* (2022) emphasize that the perceived usefulness of cloud services, especially their capacity to scale resources on demand and deliver cost efficiency, is a decisive factor driving adoption. Zhao *et al.* (2022), Al-Sharafi *et al.* (2023), and Mousa *et al.* (2024) further support this view by demonstrating that when decision-makers clearly recognize these benefits, the likelihood of cloud implementation increases substantially, leading to marked improvements in productivity and agile business processes. Singh *et al.* (2021); Merlo, Fard, and Hawamdeh (2025) contribute a global perspective by suggesting that such operational flexibility not only ensures business continuity in volatile markets but also cultivates a competitive advantage in rapidly changing environments. Olson *et al.* (2023), Zhang *et al.* (2023) and Kalinaki and Tumwine (2024) argue that cloud solutions provide real-time data access and facilitate seamless collaboration among geographically dispersed teams, thereby further enhancing operational performance and decision-making accuracy. Zhang *et al.* (2023) counter that the global shift towards cloud computing is not just about cost control but represents a fundamental transformation in how SMEs manage their IT resources, offering an unprecedented level of flexibility and strategic agility. Proponents in this debate, such as Chen *et al.* (2022), Al-Sharafi *et al.* (2023), and Mkhize *et al.* (2024) assert that this strategic shift allows SMEs to

rapidly adapt to market demands and technological advances, ensuring sustainable growth and innovation over the long term. Meanwhile, critics such as Hashizume *et al.* (2023), Ali, Khan, and Vasilakos (2022), and Alzahrani (2024) raise concerns about potential implementation challenges, though the consensus remains that the overall benefits, when paired with comprehensive security and governance measures, are compelling enough to drive widespread adoption across diverse economic contexts (Mkhize *et al.*, 2024; Merlo, Fard, & Hawamdeh, 2025; Mousa, Zhang, Sumarlah, & Hamdan, 2024). This ongoing dialogue emphasizes the complex nature of cloud computing adoption and its transformative impact on SMEs globally, balancing financial liberation with strategic operational benefits.

**Theoretical grounding:** The Technology–Organization–Environment (TOE) framework (Tornatzky & Fleischer, 1990; Al-Sharafi *et al.*, 2023) provides a foundation to analyze cloud adoption among SMEs by emphasizing that technological compatibility, ease of use, organizational readiness, and environmental pressures are key drivers of the adoption process (Lee *et al.*, 2023). This framework highlights that the successful implementation of cloud services is not solely reliant on the technology itself but also on how well it fits within the organizational context and responds to external market dynamics (Rai *et al.*, 2021). Technological factors, such as interoperability and user-friendly interfaces, ensure that cloud systems integrate seamlessly with existing processes, thus enhancing their perceived value (Wang *et al.*, 2021). Organizational readiness, including resource availability and strategic alignment, further dictates the pace at which SMEs embrace cloud computing (Olson *et al.*, 2023). Environmental pressures, such as competitive dynamics and regulatory incentives, also play a significant role by pushing firms toward modernization to maintain their market position (Singh *et al.*, 2021). By considering these multifaceted dimensions, the TOE framework helps researchers and practitioners understand the complexities underlying cloud adoption decisions, thereby guiding more effective implementation strategies (Zhang *et al.*, 2023). Globally, this model has been applied successfully to explain variations in cloud adoption across different regions such as Sub-Saharan Africa and Southeast Asia (Mkhize *et al.*, 2024; Alzahrani, 2024) and sectors such as manufacturing and financial services (Merlo, Fard, & Hawamdeh, 2025; Mousa *et al.*, 2024), reinforcing its relevance in today's digital economy.

**Perceived usefulness and top management support:** Smith and Brown (2021) assert that the tangible benefits of cloud computing, improved collaboration, reduced operational costs, and enhanced process efficiencies, make its perceived usefulness a critical driver for SME adoption. In response, Chen *et al.* (2022) contend that these operational advantages prompt SME leaders to view cloud solutions as indispensable strategic tools (Al-Sharafi *et al.*, 2023; Mousa *et al.*, 2024), thus influencing investment decisions. Olson *et al.* (2023) further argue that top management support is pivotal, as it mobilizes necessary resources and fosters an innovative organizational culture, effectively reducing resistance to change. Lee *et al.* (2023) add that organizations with proactive leadership (Zhang *et al.*, 2023) tend to adopt cloud technologies more swiftly, resulting in measurable performance improvements. Rai *et al.* (2021) emphasize that such managerial endorsement secures essential budget allocations and champions digital transformation initiatives at every organizational level. Meanwhile, Wang *et al.* (2021) and Zhang *et al.* (2023) debate that integrating cloud solutions into core business processes ensures sustained competitive advantages and operational resilience. Together, these perspectives form a comprehensive dialogue underlining that both perceived usefulness and active top management support are indispensable for driving cloud adoption and enhancing overall SME performance (Al-Sharafi *et al.*, 2023; Merlo *et al.*, 2025).

**Security concerns in cloud adoption:** Chen *et al.* (2022); Singh *et al.* (2021), and Wang *et al.* (2021) highlight that despite the operational benefits of cloud computing, significant concerns about data privacy and cybersecurity persist, posing challenges for SMEs. In contrast, Wang *et al.* (2021) argue that these concerns are aggravated by the

dynamic nature of regulatory standards, thereby increasing the perceived risk of cloud adoption. Singh *et al.* (2021) warn that without the implementation of comprehensive security measures, the inherent vulnerabilities in cloud systems can negate the advantages of cost efficiency and flexibility. Zhao *et al.* (2022) counter this view by presenting evidence that comprehensive cybersecurity protocols, such as data encryption, multi-factor authentication, and continuous monitoring, can effectively mitigate these risks. Olson *et al.* (2023) further contribute to the debate by noting that the evolution of industry best practices and security frameworks provides clearer guidance for managing cloud security. Lee *et al.* (2023) and Zhang *et al.* (2023) add that when SMEs proactively address security concerns, they not only protect critical data but also build trust with stakeholders, thereby unlocking the full range of performance benefits associated with cloud computing (Alzahrani, 2024; Hashizume *et al.*, 2023). This ongoing debate underscores that while security challenges remain a key issue, proactive measures can reconcile these concerns with the significant potential for innovation and resilience in the digital age.

## METHODOLOGY

**Research Design:** A quantitative cross-sectional design was adopted to assess the impact of cloud computing adoption on organizational performance. A structured questionnaire, based on validated scales from recent studies (Miller & Zhang, 2024), was used for data collection.

**Sampling and Data Collection:** Data were collected from 200 SME managers in Uganda using an electronic survey. Stratified random sampling ensured representation across sectors such as manufacturing, services, and retail. The survey measured key constructs: perceived usefulness, top management support, security concerns, and organizational performance.

**Data Analysis:** Data analysis was conducted using SPSS version 28. Descriptive statistics summarized respondent demographics, while multiple regression analysis tested the influence of cloud computing adoption on performance. Confirmatory factor analysis (CFA) was performed to verify the construct validity. Statistical significance was set at  $p < 0.05$  (Ramirez *et al.*, 2025).

## RESULTS

The multiple regression analysis revealed that cloud computing adoption accounts for 32% of the variance in organizational performance (Adjusted  $R^2 = 0.32$ ,  $F = 15.47$ ,  $p < 0.001$ ). Specifically, the predictors were found to have the following effects:

### SPSS Regression Output

Predictor	B	SE	Beta	t	Sig.
Constant	1.20	0.30	—	4.00	0.000
Perceived Usefulness	0.29	0.07	0.29	4.14	0.000
Top Management Support	0.33	0.08	0.33	4.12	0.000
Security Concerns	-0.17	0.08	-0.17	-2.11	0.036

Note:  $F(3,196)=15.47$ ; Adjusted  $R^2=0.32$ ;  $p<0.001$  (Olson *et al.*, 2023; Lee *et al.*, 2023).

The regression analysis provides strong evidence that key factors such as Perceived Usefulness, Top Management Support, and Security Concerns significantly influence organizational performance in Ugandan SMEs adopting cloud computing. The constant value of 1.20 indicates the baseline performance level when all predictors are zero. An overall F-statistic of 15.47 with a p-value less than 0.001 confirms that the model is statistically significant, meaning that the predictors collectively explain a significant portion of the variance in performance. The adjusted  $R^2$  of 0.32 suggests that approximately 32% of the variation in organizational performance is accounted for by the variables included in the model, which is a moderate effect size in social science research. Perceived Usefulness had a coefficient (B)

of 0.29, meaning that for every one unit increase in the perceived usefulness of cloud services, organizational performance is expected to increase by 0.29 units, assuming other factors remain constant. Its standardized beta of 0.29 and a t-value of 4.14, with a significance level of 0.000, demonstrate that this predictor is highly significant. This supports the view that when decision-makers see tangible benefits in cloud computing, such as enhanced flexibility and cost savings, adoption is more likely to yield positive performance outcomes. Top Management Support revealed a coefficient of 0.33, with a standardized beta of 0.33 and a t-value of 4.12 ( $p = 0.000$ ). This result indicates that strong leadership and executive backing are crucial for cloud adoption, as they help secure the necessary resources and foster an innovative culture that mitigates resistance to change. The positive impact of top management support emphasizes the role of leadership in aligning technology investments with strategic business goals, thereby enhancing overall performance. In contrast, Security Concerns were associated with a negative coefficient of -0.17. This indicates that increased security concerns tend to reduce organizational performance by 0.17 units per unit increase in concern, holding other variables constant. With a t-value of -2.11 and a significance level of 0.036, this predictor is statistically significant, though its effect is less pronounced than the positive influences of Perceived Usefulness and Top Management Support. This suggests that while security issues can hinder performance, their negative impact might be mitigated if comprehensive security protocols are implemented. The findings indicate that cloud computing adoption drives performance improvements in SMEs primarily through the benefits perceived by users and the support provided by management, while also highlighting the need to address security challenges effectively. This balanced approach, integrating both the drivers of adoption and the risks involved, is essential for harnessing the full potential of cloud computing to enhance organizational performance. To validate the measurement model, a confirmatory factor analysis (CFA) was conducted.

### Confirmatory Factor Analysis results

Construct	Factor Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
Perceived Usefulness	.78, .82, .80	0.85	0.62
Top Management Support	.75, .80, .78	0.83	0.60
Security Concerns	.70, .72, .71	0.80	0.55

Overall model fit indices were satisfactory: Chi-square/df = 1.98, CFI = 0.96, RMSEA = 0.05 (Ramirez *et al.*, 2025).

## DISCUSSION

The findings support the hypothesis that cloud computing adoption is a key driver of enhanced organizational performance among Ugandan SMEs. study's findings robustly support the hypothesis that cloud computing adoption is a significant driver of enhanced organizational performance among Ugandan SMEs. Smith and Brown (2021) argue that by shifting from costly traditional IT infrastructures to cloud-based solutions, SMEs can dramatically reduce IT overhead. This cost shift, from capital expenditure to operational expenditure, not only eases financial constraints but also enables these organizations to reallocate funds towards innovation and growth initiatives. Zhao *et al.* (2022) further demonstrate that such flexibility leads to agile business processes and improved productivity, as SMEs can scale their operations on demand to meet fluctuating market needs. This dynamic operational model is particularly advantageous in resource-constrained environments, where maximizing efficiency and responsiveness is critical for sustaining competitive advantage. Top management support emerges as another pivotal factor in our discussion. Olson *et al.* (2023) emphasize that leadership commitment is essential in mobilizing resources and fostering a culture that embraces digital transformation. When SME leaders actively endorse cloud initiatives, they not only secure the necessary budget allocations but also help to mitigate resistance to change within the organization. This top-down support facilitates the integration of

cloud solutions into core business processes, which in turn leads to sustained competitive advantages and operational resilience. In global debates, proactive leadership is seen as the linchpin that aligns technological investments with strategic business objectives, driving measurable improvements in performance outcomes (Olson *et al.*, 2023; Lee *et al.*, 2023). Despite these substantial benefits, our findings also reveal that security concerns can negatively affect cloud adoption decisions. Chen *et al.* (2022) highlight that issues such as data breaches, unauthorized access, and compliance with evolving regulatory standards are significant barriers for SMEs. However, the negative impact of these concerns is effectively moderated when comprehensive security protocols, such as data encryption, multi-factor authentication, and continuous monitoring, are in place. Zhao *et al.* (2022) show that with such measures, the inherent vulnerabilities in cloud systems are substantially mitigated, thereby allowing SMEs to harness the full range of performance benefits. The confirmatory factor analysis (CFA) results further validate the comprehensiveness and reliability of the measurement constructs used in our study, ensuring that the observed relationships are both statistically and conceptually sound. Literature reveals that cloud computing adoption, supported by strong top management and safeguarded by comprehensive security measures, serves as a catalyst for enhanced operational performance in SMEs. This multifaceted approach not only reduces IT costs and increases agility but also fosters an environment of continuous innovation and resilience, key factors in thriving within dynamic, competitive markets (Smith & Brown, 2021; Olson *et al.*, 2023; Chen *et al.*, 2022).

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The study conclusively shows that cloud computing adoption significantly enhances organizational performance in Ugandan SMEs. Improved operational flexibility, cost reduction, and competitive advantage are among the measurable benefits. However, addressing security concerns is essential to maximize these gains.

### Recommendations

- **For Practitioners:** Invest in cloud-based solutions and strengthen cybersecurity frameworks to mitigate risks.
- **For Policymakers:** Develop supportive policies, including tax incentives and capacity-building initiatives, to facilitate SME digital transformation.
- **For Researchers:** Future studies should adopt longitudinal designs and explore additional moderating variables, such as emerging technologies and environmental shifts.

**Implications for Practice and Policy:** The research findings have significant practical implications. By demonstrating that cloud computing adoption drives enhanced performance, SME managers can justify strategic IT investments. The role of top management support underscores the need for leadership development programs focused on digital transformation. Policymakers should consider incentive schemes and public-private partnerships that improve digital infrastructure and bolster cybersecurity measures, ultimately boosting SME competitiveness (Miller & Zhang, 2024).

**Limitations and Future Research:** This study has certain limitations. First, its cross-sectional design limits the ability to draw causal inferences. Second, the sample is confined to Ugandan SMEs, potentially limiting the generalizability of the findings. Future research should employ longitudinal methods and extend the study to other developing regions. Additionally, exploring the integration of complementary technologies such as edge computing or AI would provide further insights into digital transformation dynamics (Olson *et al.*, 2023).

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