EFFECT OF CLOUD COMPUTING ON ORGANISATIONAL PERFORMANCE IN THE NIGERIAN OIL AND GAS COMPANIES

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ABSTRACT

Cloud computing is a key driver of digital transformation, yet its implications for organisational performance in resource-dependent economies remain underexplored. This study examines the effect of cloud computing on organisational performance in Nigerian oil and gas companies, a sector central to national revenue but challenged by high costs, regulation, and data management. Grounded in the Technology Acceptance Model (TAM), Diffusion of Innovations (DOI), and the Resource-Based View (RBV), cloud computing is measured through adoption (in months), scalability, and availability, while organisational performance is assessed via profitability, operational efficiency, and privacy risks exposure. A quantitative, cross-sectional survey was conducted using a structured Likert-scale questionnaire. Data were obtained from employees of selected International Oil Companies (IOCs) and National Oil Companies (NOCs) in Nigeria through purposive and convenience sampling. Statistical techniques including descriptive, correlation, and regression modelling, were used for analysis. Findings show that cloud adoption significantly improves profitability by lowering costs and enabling data-driven decisions. Scalability enhances operational efficiency through flexible resource allocation. However, increased availability exposes organisations to privacy risks, raising concerns about cybersecurity and compliance. This study contributes by providing empirical evidence of cloud computing's dual role as both enabler and vulnerability in emerging economies. It extends TAM, DOI, and RBV, showing how adoption, diffusion, and strategic resources shape outcomes. Policy implications highlight the need for stronger data protection and risk-mitigation strategies to balance innovation with security in Nigeria's oil and gas sector.

***Keywords*:** Cloud Computing, Operational Efficiency, Organisational Performance, Privacy Risk Exposure, Profitability

INTRODUCTION

In today's rapidly evolving business environment, organisations face both unprecedented challenges and opportunities. To remain competitive, firms increasingly rely on advanced technologies that enhance efficiency, profitability, and adaptability (Skare & Soriano, 2021). Among such technologies, cloud computing has emerged as a transformative force that revolutionises the storage, processing, and access of data and applications (Mohamed, Oluwaseyi, & Robert, 2024). Cloud computing delivers services over the internet, reducing dependence on on-premises infrastructure and offering organisations greater flexibility in resource management. In the oil and gas industry, cloud adoption was initially met with scepticism due to concerns about data security, compliance, and legacy system integration (Mardan, Al-Obaidi, & Kadhim, 2023). Traditionally, Nigerian oil and gas firms relied on in-house data centres to process vast amounts of information generated from exploration, drilling, and production. While this data centers provided data control, it resulted in high costs and limited scalability. However, the proliferation of Internet of Things (IoT) devices, the growing complexity of analytics, and external shocks such as the COVID-19 pandemic have accelerated the adoption of cloud solutions (Duarte, Silva, & Durán, 2023). Today, companies are increasingly leveraging cloud computing for reservoir simulation, production optimisation, and supply chain management, as well as predictive analytics for equipment maintenance (Adesina, Iyelolu, & Okpeke, 2024). Despite these advances, significant gaps remain. First, while global studies confirm the benefits of cloud computing for cost reduction and efficiency (Gangwar, 2017; Jha & Jha, 2024), there is limited empirical evidence quantifying its effect on profitability and operational efficiency within Nigerian oil and gas companies. Existing research often relies on qualitative assessments, with few studies applying rigorous quantitative designs. Second, the combined impact of scalability, availability, and privacy risk in this sector remains underexplored. Prior studies typically analyse these factors in isolation, overlooking their interactions and implications for organisational performance. Finally, the Nigerian context offers unique insights due to its heavy dependence on oil revenues, complex regulatory environment, and exposure to both global energy dynamics and local institutional weaknesses. Understanding how Nigerian firms navigate cloud computing will provides valuable lessons for other resource-dependent economies.

This aim of this study is to examine the effect of cloud computing on organisational performance in the Nigerian oil and gas companies. However, the specific objectives are to examine the impact of cloud computing adoption on the profitability of the Nigerian oil and gas companies; determine the effect of scalability of cloud computing solutions on operational efficiency of the Nigerian oil and gas companies; and establish if availability in cloud computing exposes the organisation to privacy risk. The remainder of this paper is structured as follows. Section 2 reviews relevant literature and theoretical foundations. Section 3 outlines the research methodology, including data collection and analysis procedures. Section 4 presents the findings of the study and discusses the implications of these findings considering existing literature. Finally, Section 5 concludes with recommendations, contribution to knowledge, limitation and future research.

LITERATURE REVIEW

Cloud Computing

Cloud computing has emerged as a disruptive technological innovation with profound implications for how organisations manage resources, data, and operations. It is defined as the delivery of computing resources—including servers, storage, applications, and services—over the internet on a pay-as-you-go basis (Marston, Li, Bandyopadhyay, Zhang, & Zhang, & Ghalsasi, 2011) without requiring direct ownership of infrastructure. Scholars emphasise that its core characteristics are scalability, elasticity, availability, and cost-efficiency, which make it particularly relevant for data-intensive and capital-intensive industries such as oil and gas (Chen, Guo, & Shangguan, 2022). In developing economies like Nigeria, where infrastructural limitations and cost pressures constrain competitiveness, cloud computing offers firms the opportunity to optimize operations while minimizing capital outlay (Accenture, 2020).

Cloud Computing Adoption

Cloud computing adoption refers to the decision to integrate cloud technologies into organisational processes, influenced by internal readiness, perceived benefits, and external pressures. Adoption of cloud technologies is shaped by both perceived usefulness and ease of use, as highlighted by the Technology Acceptance Model (TAM) (Davis, 1989). Firms adopt when they see clear benefits—such as cost savings, faster decision-making, and enhanced collaboration (Chen & Chang, 2020). In Nigeria's oil and gas industry, adoption is influenced by legacy infrastructure, regulatory uncertainty, and the availability of skilled labour (Adesina, Iyelolu, & Okpeke, 2024).

While TAM explains user acceptance at the micro-level, the Diffusion of Innovations (DOI) theory expands this by showing how organisational adoption depends on observability, trialability, and compatibility with existing practices (Rogers, 2003). Yet, many Nigerian firms remain cautious due to cybersecurity risks and inconsistent power supply, which complicate reliability (Ibrahim & Muslim, 2023). The Resource-Based View (RBV) adds a strategic dimension, positioning cloud adoption not just as an IT upgrade but as a potential rare and inimitable capability for building advantage in a competitive market.

Scalability

Scalability is one of cloud computing's most distinctive attributes, enabling firms to dynamically adjust resources based on demand (Gangwar, 2017). This is crucial in oil and gas, where workloads fluctuate with exploration cycles and global energy demand. From an RBV perspective, scalability constitutes a valuable and hard-to-imitate capability that aligns IT resources with business strategy (Barney, 1991). Empirical studies affirm that scalability enhances operational efficiency by avoiding over-provisioning and reducing costs of idle infrastructure (Chen & Chang, 2020). However, in the Nigerian context, scalability also exposes firms to dependence on global providers, currency fluctuations in subscription fees, and the challenge of integrating scalable solutions with ageing legacy systems. This underscores the duality of scalability as both an efficiency driver and a dependency risk.

Availability

High availability—ensuring that systems are always accessible—is vital in oil and gas operations where downtime can cost millions of dollars. The Diffusion of Innovations (DOI) theory explains that reliability is a core determinant of adoption, as firms are more likely to adopt innovations perceived as robust and resilient (Rogers, 2003). In practice, cloud vendors provide Service Level Agreements (SLAs) guaranteeing uptime, but empirical studies show that outages remain a concern (Wang, Yu, & Yu, 2023). For Nigerian firms, availability is complicated by weak broadband infrastructure, intermittent electricity supply, and exposure to geopolitical risks that affect data sovereignty. While availability supports resilience and real-time decision-making, it simultaneously raises the probability of privacy risks due to increased points of access and reliance on external vendors.

Organizational Performance

Organisational performance is a multidimensional construct that reflects how effectively firms achieve their strategic and operational goals. In the oil and gas industry, where operations are capital-intensive and data-driven, performance is often evaluated not only through financial outcomes but also through efficiency and risk management (Marston et al., 2011; Okeke, 2021).

Profitability

Profitability is a key performance metric for any organisation. Studies link cloud adoption to improved profitability through reduced IT capital expenditures, improved asset management, and access to advanced analytics (Latifian, 2022; Marston et al., 2011). In Nigeria's oil and gas industry, where firms face declining margins due to global price volatility and rising regulatory compliance costs, cloud computing offers opportunities to streamline expenses and optimise production leading to higher profitability. However, critics argue that hidden costs—such as subscription escalations, migration expenses, and cybersecurity investments—can erode profitability (Gangwar, 2017). The mixed evidence suggests that profitability gains depend not merely on adoption but on how well firms align cloud strategies with broader business models.

Operational Efficiency

Operational efficiency reflects the ability to maximise outputs while minimising waste, a critical source of advantage in competitive industries. Cloud computing enhances efficiency by enabling real-time analytics, predictive maintenance, and collaboration across geographically dispersed teams (Okeke, 2021). From the RBV perspective, operational efficiency arises when cloud-enabled capabilities are integrated with firm-specific processes, producing outcomes competitors cannot easily replicate (Barney, 1991). In Nigeria, efficiency gains are particularly important given the sector's high logistics costs, infrastructural challenges, and complex joint-venture operations between IOCs and NOCs. Yet, without adequate digital skills and change management, the efficiency potential of cloud solutions may remain underutilised.

Privacy Risk Exposure

Privacy risk exposure in cloud computing refers to the potential for unauthorized access, use, or disclosure of sensitive data stored or processed in the cloud, which can compromise the privacy and security of individuals' information. The Diffusion of Innovations (DOI) theory acknowledges that perceptions of risk strongly influence adoption decisions; organisations will delay adoption if they believe security measures are inadequate (Rogers, 2003). Nigerian oil and gas firms are

especially vulnerable due to the sensitivity of exploration data and geopolitical implications of energy information. Weak enforcement of Nigeria's data protection regulations further amplifies these risks (Ibrahim & Muslim, 2023). Consequently, while availability enhances resilience, it paradoxically increases the attack surface for privacy breaches. This tension illustrates cloud computing's double-edged impact on organisational performance: enabling efficiency and profitability while heightening exposure to risks.

Theoretical Review

This study integrates three theoretical perspectives—the Technology Acceptance Model (TAM), Diffusion of Innovations (DOI) theory, and the Resource-Based View (RBV)—to provide a multidimensional understanding of cloud computing adoption and its implications for organisational performance in Nigerian oil and gas companies. Rather than viewing these frameworks in isolation, they are synthesised to capture the interplay between individual perceptions, organisational adoption dynamics, and firm-level resource utilisation.

Technology Acceptance Model (TAM), developed by Davis (1989), explains adoption at the individual level by emphasising perceived usefulness (PU)- the extent to which users believe a technology will improve their job performance, and perceived ease of use (PEOU)- the degree to which they believe the technology is effort-free. In the oil and gas sector, PU translates to benefits such as improved decision-making and cost savings, while PEOU relates to employees' ability to seamlessly integrate cloud services into workflows (Marston et al., 2011). However, TAM has been critiqued for focusing narrowly on cognitive perceptions and underestimating structural and contextual barriers (Venkatesh, Morris, Davis, & Davis, 2003; Andwika & Witjaksono, 2020). For Nigerian oil and gas companies, where infrastructure limitations and regulatory complexities play significant roles, TAM alone cannot fully explain adoption, though TAM remains useful for understanding how individual perceptions shape cloud computing adoption in sectors like oil and gas, where technological innovation is key to efficiency and profitability.

Diffusion of Innovations (DOI) theory (Rogers, 2003) complements TAM by broadening the lens to organisational and societal adoption processes. The theory explains how innovations spread within a social system, providing insight into adoption processes and factors affecting the rate and reach of adoption across contexts. It explains how relative advantage, compatibility, complexity, trialability, and observability shape cloud adoption. For instance, the relative advantage of reduced

IT costs drives adoption in Nigerian firms, yet infrastructural deficits and shortage of skilled personnel increase perceived complexity (Ayodele, 2020). While DOI highlights adoption trajectories—from innovators, early adopters, early majority, late majority, to laggards— with each influencing the adoption curve differently, it has been criticised for its linearity and Western-centric bias (Sahin, 2006; Suneetha & Bhagwan, 2024). These limitations are particularly salient in Nigeria, where adoption may be shaped more by regulatory pressures and international oil company (IOC) influence than by classical adopter categories.

The Resource-Based View (RBV) theory, initially conceptualized by Edith Penrose in 1959, gained prominence in the late 1980s and 1990s through the works of scholars like Birger Wernerfelt and Jay Barney. Barney's (1991) refinement introduced the VRIN framework, asserting that only resources that are valuable, rare, inimitable, and non-substitutable can provide a firm with a sustainable competitive advantage (Barney, 1991). In the Nigerian oil and gas industry, the Resource-Based View (RBV) helps explain how firms can leverage cloud computing as a valuable resource to enhance profitability and operational efficiency while managing privacy risks (Barney, Ketchen, & Wright, 2021; Oria, Crook, Ketchen, Sirmon, & Wright, 2021). RBV highlights the importance of both tangible assets like technology and intangible resources like organisational knowledge. Nonetheless, RBV’s static assumptions have been critiqued for neglecting how dynamic environments, such as Nigeria’s volatile oil sector, require continuous resource reconfiguration (Teece, Pisano, & Shuen, 1997). To address these issues, recent developments have integrated RBV with frameworks like the Dynamic Capabilities Framework, emphasizing the need for firms to adapt and reconfigure resources in response to changing environments (Teece, Pisano, & Shuen, 1997). In conclusion, RBV theory helps explain why some firms are more successful in adopting and integrating cloud computing technologies.

Empirical Review

The adoption of cloud computing in the oil and gas industry has been widely studied, but findings often diverge across contexts. While much of the literature confirms its potential to improve profitability and operational efficiency, questions remain about its long-term impact on privacy and data security. This section synthesises empirical evidence on adoption, scalability, and availability, showing both convergences and tensions in research outcomes, particularly within the Nigerian context.

Cloud Computing Adoption and Profitability

Empirical studies consistently link cloud adoption to profitability gains through cost reductions and resource optimisation. Marston et al. (2011) emphasise reductions in capital expenditure as firms shift from on-premises to pay-per-use models, while Chen, Guo, and Shangguan (2022) demonstrate enhanced organisational effectiveness through improved data-driven decisions. In Nigeria, Lawan, Oduoza, and Buckley (2021) reported a 15% reduction in IT costs, and a 20% profitability increase among adopters. However, some scholars note hidden costs associated with migration, training, and vendor lock-in, which may offset initial gains (Gupta, Seetharaman, & Raj, 2013). These contradictions suggest profitability is not automatic but contingent on adoption strategy and contextual readiness.

Scalability and Operational Efficiency

Scalability is empirically associated with improvements in efficiency. Gupta et al. (2013) found scalable solutions led to a 25% increase in efficiency globally, while Kapila and Onyeme (2024) observed a 30% efficiency gain in a Nigerian oil and gas firm, attributed to faster data processing and improved decision-making. Yet, scalability benefits are not uniform: without adequate bandwidth and infrastructure, efficiency improvements may be undermined, particularly in Nigeria's remote production areas where digital infrastructure remains weak (Bakare, 2020). Thus, empirical evidence shows scalability is a potential enabler but dependent on infrastructure readiness.

Availability and Privacy Risk Exposure

High availability supports business continuity but introduces complex privacy challenges. Subashini and Kavitha (2011) showed that even with service level guarantees, data breaches remain common. In Nigeria, Ofili (2015) and Bakare (2020) documented how oil and gas firms adopting cloud platforms faced increased exposure to cyberattacks, with regulatory gaps exacerbating vulnerabilities. While some studies highlight mitigation through multi-factor authentication and audits (Haniyi, Masa'd, & Hijazeen, 2020), others argue that reliance on foreign service providers introduces sovereignty risks that are particularly sensitive in the Nigerian oil industry (Ugwu, Odo, Oluka, & Salami, 2021).

Integrated effect on Profitability, Operational Efficiency, and Privacy Risk Exposure

Few studies examine profitability, efficiency, and privacy risks together, but integrated findings are emerging. Haniyi et al. (2020) reported simultaneous improvements in profitability (20%) and efficiency (25%) while privacy risks fell by 15% due to strong governance practices. Conversely, Alabi and Olatunji (2021) observed profitability (+22%) and efficiency (+28%) gains in Nigerian firms but only modest reductions in privacy risk (10%), suggesting that adoption benefits can outpace security improvements if firms lack robust frameworks. This divergence highlights the need for Nigerian oil and gas companies to adopt balanced strategies that do not prioritise efficiency at the expense of security.

Overall, Empirical evidence supports cloud computing as a source of competitive advantage through cost savings, resource optimization, and better decision-making. For Nigerian oil and gas firms, strategic cloud adoption can enhance overall performance and mitigate risks, unlocking the full potential of cloud computing for sustained success.

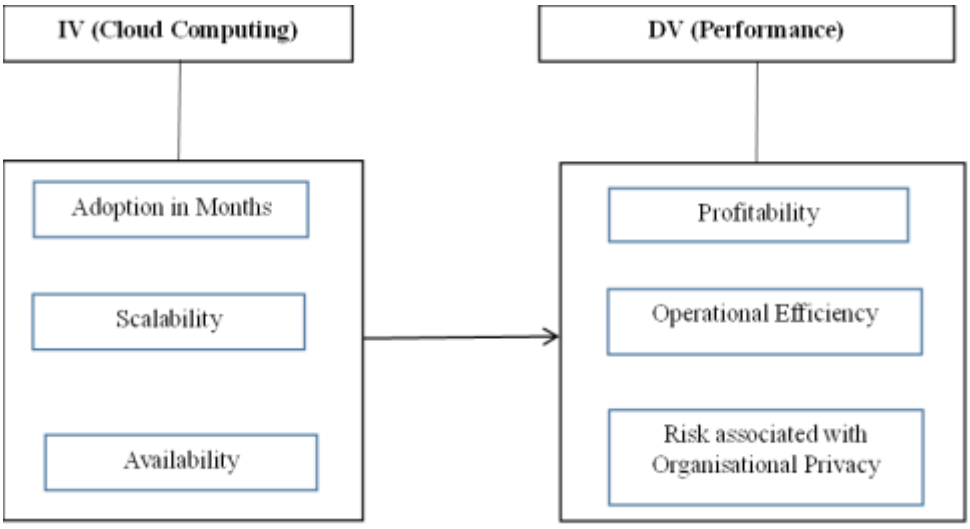
Based on the above research objectives, the null hypotheses tested were as follows:

H_{01}: There is no significant difference in the profitability of oil and gas companies as a result of the adoption of cloud computing.

H_{02}: There is no significant difference in the operational efficiency of oil and gas companies with the scalability provided by cloud computing.

H_{03}: There is no significant difference in the privacy risk exposure of oil and gas companies due to the availability of cloud computing.

Conceptual Framework



IV represent independent variables while DV represent dependent variable.

METHODOLOGY

This study adopted a quantitative research design with a cross-sectional survey approach to investigate the effect of cloud computing on organisational performance in Nigerian oil and gas companies. The cross-sectional design enabled data collection at a single point in time from multiple respondents, offering efficiency and cost-effectiveness

The population of this study comprised IT professionals in specialised roles such as cloud administrators, systems engineers, and digital transformation officers within Nigerian oil and gas companies. For this research, ten (10) companies were purposively selected to represent the broader sector. The selection was based on willingness to participate, representativeness across national, indigenous, and international oil and gas firms in Nigeria, and resource constraints related to access and data collection. This approach ensured that the companies included were both information-rich and aligned with the objectives of the study, while also balancing feasibility considerations. Furthermore, industry reports (PwC, 2016; Deloitte, 2023; NNPC, 2020) suggest that large oil and gas firms typically employ between eight (8) and fourteen (14) IT personnel in specialised cloud administration roles. This makes the average number of specialised IT personnel per company to be eleven (11), leading to an accessible population of approximately 110 respondents across the 10 selected companies. To ensure sufficient statistical power for quantitative analysis, the study targeted 90 valid responses, anticipating eighteen percent (18%)

attrition rate for potential non-responses and incomplete questionnaires. Accordingly, the initial distribution aimed for 108 questionnaires, thereby accommodating expected drop-offs while still meeting the required valid response threshold. The study employed purposive and convenience sampling. Purposive sampling was appropriate since the research required respondents with direct knowledge and expertise in cloud computing adoption and management. Convenience sampling supported access to respondents within the selected companies.

Data were collected using a structured questionnaire, adapted from validated instruments in prior empirical studies on cloud computing and organisational performance. The questionnaire comprised five sections covering demographic characteristics, cloud computing adoption, scalability, availability and privacy risks, and organisational performance indicators such as profitability and operational efficiency. Items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Content validity was ensured through expert review and alignment with research objectives, while a pilot test was conducted to refine clarity. Reliability was confirmed through Cronbach's alpha, which yielded a coefficient of 0.872, surpassing the recommended 0.70 threshold for internal consistency (Robertson & Scott Evans, 2020). The questionnaire was distributed electronically via email and professional platforms to maximise reach and ensure respondent anonymity. Participation was voluntary, and ethical considerations such as informed consent and confidentiality were strictly observed. Out of the targeted 108 respondents, 90 valid responses were retained for analysis

Microsoft Excel was used to collate responses. Data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (means, standard deviations, and frequencies) summarised respondent characteristics and perceptions. Inferential statistics, including correlation and multiple regression analysis, tested the hypothesised relationships between cloud computing adoption, scalability, and availability (independent variables) and profitability, operational efficiency, and privacy risks (dependent variables). The significance level was set at 0.05. Regression results were presented in tables for clarity.

FINDINGS OF THE STUDY

The following tables and conceptual diagram present the results of the regression analysis, highlighting the relationships between cloud computing dimensions (adoption, scalability,

availability) and organisational performance outcomes (profitability, operational efficiency, privacy risk).

Table 1: Descriptive statistics of responses

ORGANISATIONAL PERFORMANCE	Mean	Median	Mode	Standard deviation
Profitability	3.96	4.00	4.00	0.57
Operational Efficiency	3.72	4.00	5.00	0.64
Risk of Privacy Exposure	3.34	3.5	4.00	0.82

Table 1 shows the descriptive statistics of organisational performance indicators. Respondents reported moderately high perceptions of profitability (M = 3.96, SD = 0.57) and operational efficiency (M = 3.72, SD = 0.64), while privacy risk exposure was relatively lower but notable (M = 3.34, SD = 0.82). These findings suggest that while cloud computing is perceived to enhance performance outcomes, concerns about security remain salient in Nigerian oil and gas companies.
Conceptual diagram

Cloud Adoption and Profitability

Hypotheses one: There is no significant difference in the profitability of oil and gas companies after the adoption of cloud computing.

Table 2: Regression Analysis Predicting Profitability from Cloud Adoption

Predictor	B	SE B	β	t	p	95% CI for B
Constant	2.60	0.38	—	6.88	.000	[1.85, 3.35]
Cloud Adoption	0.30	0.10	.32	3.20	.002	[0.12, 0.49]

Model summary: $R = .32$, $R^2 = .10$, Adjusted $R^2 = .09$, $F(1, 88) = 10.27$, $p = .002$

Regression results in Table 3 reveal a statistically significant relationship between cloud adoption and profitability ($\beta = 0.323$, $t = 3.204$, $p = .002$). However, the explanatory power was modest ($R^2 = .104$), indicating that adoption explains only 10.4% of variance in profitability. This finding

supports the Technology Acceptance Model (TAM), where perceived usefulness drives technology adoption to yield performance benefits (Davis, 1989). It also aligns with Lawan, Oduoza, and Buckley (2021), who found that cloud adoption reduced IT costs and improved financial outcomes in Nigerian oil companies. Nonetheless, the low R^2 suggests that other contextual factors such as oil price volatility, regulatory pressures, and organisational strategies also shape profitability, beyond adoption alone.

Scalability and Operational Efficiency

Hypotheses two: There is no significant difference in the operational efficiency of oil and gas companies with the scalability provided by cloud computing.

Table 3: Regression Analysis Predicting Operational Efficiency from Scalability

Predictor	B	SE B	β	t	p	95% CI for B
Constant	2.08	0.28	—	7.34	.000	[1.52, 2.64]
Scalability	0.46	0.08	.55	6.19	.000	[0.32, 0.61]

Model summary: $R = .55$, $R^2 = .30$, Adjusted $R^2 = .30$, $F(1, 88) = 38.25$, $p < .001$

As presented in Table 4, scalability was positively associated with operational efficiency ($\beta = 0.550$, $t = 6.185$, $p < .001$), with a stronger explanatory power ($R^2 = .303$). This supports the Resource-Based View (RBV), which posits that scalable resources are valuable and enable firms to align IT capacity with dynamic operational demands (Barney, 1991). The result resonates with Kapila and Onyeme (2024), who reported efficiency gains in Nigerian firms through scalable cloud systems. Yet, while scalability accounted for 30.3% of the variance, the remaining unexplained proportion suggests efficiency is also influenced by infrastructural bottlenecks and human capital constraints, as highlighted by Gupta et al. (2013).

Availability and Privacy Risk Exposure

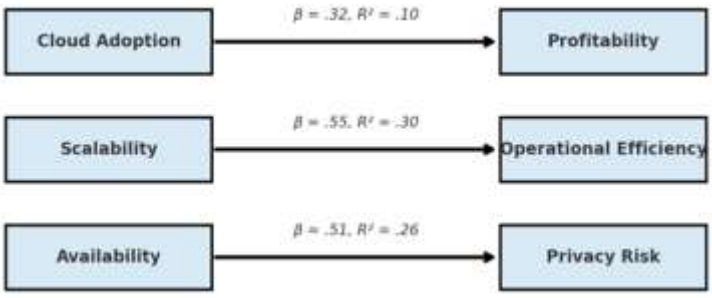
Hypotheses three: There is no significant difference in the privacy risk exposure of oil and gas companies due to the availability of cloud computing.

Table 5: Regression Analysis Predicting Privacy Risk from Availability

Predictor	B	SE B	β	t	p	95% CI for B
Constant	2.68	0.21	—	13.01	.000	[2.27, 3.09]
Availability	0.34	0.06	.51	5.61	.000	[0.22, 0.46]

Model summary: $R = .51$, $R^2 = .26$, Adjusted $R^2 = .26$, $F(1, 88) = 31.45$, $p < .001$

Table 5 demonstrates that availability of cloud systems significantly predicts privacy risk exposure ($\beta = 0.513$, $t = 5.608$, $p < .001$), with $R^2 = .263$. This indicates that higher system availability—while ensuring operational continuity—also increases exposure to risks such as data breaches and cyberattacks. This aligns with the Diffusion of Innovations (DOI) theory, where perceptions of reliability may encourage adoption, but unaddressed risks undermine broader acceptance (Rogers, 2003). Empirically, the finding corroborates Ofili (2015) and Bakare (2020), who documented heightened cybersecurity vulnerabilities in Nigerian oil and gas firms using cloud platforms. The result underscores the paradoxical nature of cloud computing: while availability enhances business resilience, it simultaneously amplifies privacy concerns.



Discussion of Findings

The first hypothesis tested whether cloud adoption enhances profitability. The results confirm a positive and significant effect, suggesting that firms adopting cloud services achieve cost savings and improved decision-making. This is consistent with Gangwar (2017) and Chen, Guo, and Shangguan (2022), who linked cloud usage to profit maximisation. From the Technology Acceptance Model (TAM) perspective, adoption improves profitability through perceived usefulness, as employees see cloud platforms as productivity enablers. However, Weldemicheal (2023) cautions that hidden costs, such as vendor lock-in, can offset gains. This indicates that

adoption benefits are contingent on how contracts and resources are managed, aligning with the Resource-Based View (RBV) emphasis on leveraging unique capabilities.

The second hypothesis found scalability to significantly improve operational efficiency. This supports Jason and Castro (2021) and Joe (2023), who highlighted scalability as a key benefit of cloud systems. Within the RBV framework, scalability is a dynamic capability, allowing firms to align IT resources with fluctuating market demands. Yet, Marston et al. (2011) noted inefficiencies when scalability is poorly governed, pointing to the need for strategic oversight to avoid cost overruns.

The third hypothesis revealed that availability increases privacy risk exposure. This finding is in line with Satish et al. (2024), who identified trust and data protection challenges as barriers to cloud adoption. The Diffusion of Innovations (DOI) theory helps explain this, as risk perceptions slow diffusion even when availability enhances relative advantage. However, Subashini and Kavitha (2011) argued that robust encryption and authentication can transform availability into a trust-enhancing feature, highlighting the conditional nature of its impact.

CONCLUSION

This study examined the effect of cloud computing on organisational performance in Nigerian oil and gas companies. The findings show that cloud adoption enhances profitability, scalability improves operational efficiency, and availability increases privacy risk exposure. Drawing on TAM, RBV, and DOI, the study highlights both the opportunities and vulnerabilities associated with cloud use in a resource-dependent sector. While cloud computing provides measurable performance benefits, the relatively low explanatory power suggests that other organisational and environmental factors also shape outcomes. Overall, cloud computing should be pursued strategically—balancing adoption and scalability with strong governance and security measures—to ensure sustainable competitive advantage in the Nigerian oil and gas industry.

Recommendation

First, managers in Nigerian oil and gas companies should adopt cloud solutions strategically, ensuring that adoption is guided by clear business objectives. Consistent with the Technology Acceptance Model (TAM), employee training and change management are essential to enhance perceived usefulness and ease of use, thereby maximising profitability benefits. Second, scalability should be treated as a strategic capability, in line with the Resource-Based View (RBV). Firms are

advised to implement hybrid or multi-cloud strategies that allow flexible scaling while avoiding vendor lock-in. Strong governance structures should also be established to prevent inefficiencies arising from uncontrolled expansion of resources. Third, the study highlights that high availability can heighten privacy risks. Drawing on the Diffusion of Innovations (DOI) theory, firms must address risk perceptions by investing in robust cybersecurity practices such as encryption, multi-factor authentication, and regular audits. At the policy level, regulators should strengthen enforcement of the Nigeria Data Protection Regulation (NDPR) and provide industry-specific guidelines tailored to the oil and gas sector.

Contribution to knowledge

This study offers industry-specific evidence on how cloud computing affects performance in the Nigerian oil and gas sector, an area where empirical work is still limited. Unlike generic discussions of efficiency, the findings show that cloud adoption reduces IT overheads and enables real-time analytics critical for high-cost exploration and production activities. Scalability was shown to directly improve operational efficiency by supporting fluctuating workloads in upstream operations such as seismic analysis and drilling simulations. Conversely, heightened privacy risks linked to availability are particularly important in this industry, where breaches could compromise sensitive geological data and regulatory compliance. These insights provide managers with a more nuanced roadmap for adopting cloud solutions in high-risk, resource-intensive contexts. By integrating the Technology Acceptance Model (TAM), Diffusion of Innovations (DOI) theory, and the Resource-Based View (RBV), this research advances understanding of cloud computing in resource-dependent industries. It demonstrates that adoption decisions are shaped not only by perceptions of usefulness (TAM) and innovation diffusion processes (DOI) but also by how scalability functions as a dynamic organisational capability (RBV). The study extends these theories by showing their combined explanatory power in a developing-economy context. Also, Policymakers and regulators such as NITDA and the Ministry of Petroleum should create tailored frameworks that address privacy risks while encouraging innovation. The study underscores the need for stronger enforcement of the Nigeria Data Protection Regulation (NDPR) and industry-specific cybersecurity guidelines. These findings also inform international debates on digital transformation in extractive industries by providing evidence from Nigeria, a leading oil economy.

Limitations of the Study

Despite significant relationships, the relatively low R^2 values (10.4%, 30.3%, and 26.3%) highlight that cloud computing dimensions only partially explain organisational performance. Other organisational, market, and regulatory factors remain influential but unmeasured. Furthermore, as both independent and dependent variables were measured through a single survey instrument, the risk of common method bias cannot be ruled out (Kock, Berbekova, & Assaf, 2021). Similarly, the sample size, while adequate for the purposes of this study, may limit the generalizability of the findings to the broader population of oil and gas companies. Future studies should incorporate multi-source data, longitudinal designs, and broader samples to strengthen causal inferences and generalisability.

Suggestion for Further Studies

Future studies should consider a larger and more diverse sample, employ longitudinal designs to assess long-term impacts, and explore additional variables that influence cloud computing adoption. A mixed-methods approach combining quantitative and qualitative data could provide deeper insights into the nuances of cloud computing integration in the oil and gas industry.

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