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Cloud Computing and Operational Efficiency among SMEs in Lagos State: A Technology-Organisation-Environment Perspective

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Abstract

Cloud computing has emerged as a critical component of modern digital infrastructure, providing scalable, flexible, and cost-effective information technology (IT) solutions for small and medium-sized enterprises (SMEs). It enables SMEs to overcome traditional operational constraints associated with legacy IT systems, including high capital expenditure, infrastructure maintenance costs, and limited system accessibility. By offering on-demand access to computing resources such as data storage, software applications, and processing power through cloud service models (Infrastructure-as-a-Service, Platform-as-a-Service, and Software-as-a-Service), cloud computing enhances organizational agility and operational efficiency. Despite its recognized potential to improve organizational performance, existing literature in developing economies has primarily focused on adoption determinants rather than evaluating the measurable operational outcomes following adoption. Grounded in the Technology-Organization-Environment (TOE) framework and Everett Rogers' Diffusion of Innovation (DOI) theory, this study critically examined the relationship between cloud computing utilization and operational efficiency among SMEs in Lagos State, Nigeria. Specifically, the study evaluated key operational performance indicators, including cost efficiency, workflow productivity, data accessibility, and decision-making effectiveness. A descriptive survey research design was adopted, and primary data were collected from 380 SME owners, managers, and senior employees through structured questionnaires. The collected data were analyzed using descriptive statistical techniques to assess adoption patterns and perceived operational impacts. The findings indicate a relatively high level of cloud computing adoption among SMEs, particularly in cloud-based storage systems and application services. This adoption was associated with reduced IT infrastructure and maintenance costs, improved workflow coordination, enhanced employee productivity, and increased accessibility to organizational data, thereby supporting more timely and informed managerial decision-making. However, the operational benefits were not uniformly realized across all SMEs. Several post-adoption constraints were identified, including cybersecurity concerns, unreliable internet connectivity, limited technical expertise, recurring subscription costs, and inadequate organizational awareness of optimal cloud utilization practices. These moderating factors significantly constrained the full realization of cloud computing benefits. The study concludes that cloud computing functions as a conditional enabler of operational efficiency rather than an automatic source of competitive advantage for SMEs in developing economies. Its effectiveness depends on the presence of enabling technological infrastructure, organizational readiness, and a supportive external environment. These findings highlight the need for targeted capacity building, improved digital infrastructure, and strategic implementation to maximize the operational value of cloud computing among SMEs.

Keywords

Cloud Computing;
Operational Efficiency;
SMEs;
Digital transformation;
Nigeria.

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1.0 Introduction

1.1 Background to the Study

The recent years have pushed organisations to achieve greater efficiency coupled with the need to keep up with the fast-changing technology. The firms all over the world are utilizing online accessories on the unparalleled levels to stay afloat, incur cost cuts and keep their operations fluid. One of the most transformative changes is the introduction of cloud computing which allows an entity to gain access to computing power, storage, and software-as-a-service via the Internet. Instead of making a huge capital investment in physical hardware, organisations are now able to acquire digital resources on a pay-as-you-go basis. The paradigm shift has transformed organisational planning and operations both in the developed and developing environments (Marston et al., 2020).

Small and medium-sized enterprises (SMEs) in Nigeria make over 80 per cent of the labour market and decisively contribute to the economic growth (SMEDAN & NBS, 2022). Irrelevant of their importance, inefficiencies that are faced by the Nigerian SMEs include poor management of resources, data systems, and high expenses of operations. Furthermore, their productivity is further limited by the inability to find monetary assistance, unstable power supply, and a low level of broadband connection (Olatunji and Akinlabi, 2021). In this respect, cloud computing is viewed as a future solution, which will provide scalability, flexibility, and less initial investment (KPMG, 2023). It is possible that the technology allows SMEs to optimize the processes, improve cooperation, and make decisions that are more well-founded due to

the access to real-time data (Abubakar and Bala, 2022).

However, empirical evidence suggests that the integration of cloud computing in the case of the Nigerian SMEs has not always been accompanied by real changes in operational performance. Surveys in technologically advanced societies like China, the United States, or other European countries show that there is a strong association between the use of cloud services and increased efficiency, which is reflected in faster services and reduction of costs (Shiferaw et al., 2020). Conversely, the studies in Nigeria have not reached a final conclusion, due to country-specific challenges, such as unreliable power supply, inadequate digital literacy, cybersecurity risks, and low managerial potential (Odufuwa et al., 2023). Such circumstances provoke one question: can a technology developed in highly-digitised economies bring the same value in less developed contexts?

Operational efficiency, in this case, goes beyond the cost-cutting, and is the best distribution of resources to maintain a steady level of service quality, a minimal number of system interruptions and an agile reaction to the market vagaries (Nuryyev et al., 2020). Cloud computing is able to support these goals, but its effectiveness depends on how far individuals and organisations are willing to adopt and use the technology. Digital potential can only be transformed into actual results with the help of trained staff, favorable regulatory policies, and versatile management systems (Okundaye et al., 2022).

To address these obstacles, the government of Nigeria has released the National Digital Economy Policy and Strategy (NDEPS 2020-2030) in an attempt to promote digital literacy and the adoption of technologies throughout the industries (Federal Ministry of Communications and Digital Economy, 2020). Nevertheless, there are very limited empirical studies about the impact of cloud computing on the operations of SMEs, and the entrepreneurs and policymakers can be left to make assumptions instead of basing their thinking on evidence.

The research therefore fills this gap of evidence. It explores the question of whether the process of adopting cloud computing does indeed contribute to the effectiveness of cost savings, operational efficiency, and decision-making capabilities among the Nigerian SMEs, and, more specifically, in Lagos, the main digital hub in Nigeria. Moreover, it determines the major barriers that prevent SMEs to take full advantage of cloud computing. The focus on Lagos, therefore, makes the research explain the process of digital transformation happening in the emerging economies and provide practical insights that can be used to shape the policies to promote the sustainable development of the SMEs.

1.3 Objectives of the Study

The main purpose of the research is to determine the influence of cloud computing on the efficiency of operations in the Nigerian SMEs particularly those that are located in Lagos State, which is the main digital-centric state of the country. The research has the following four objectives:

1. To investigate the effects of using cloud-based computing on the utilisation of the resources and cost-effectiveness of the Nigerian SMEs.
2. To evaluate how cloud-based applications impact productivity and service delivery in a few sectors of choice.
3. To find out the role of cloud computing in facilitating data access, teamwork between organisations as well as managerial decision making in SMEs.
4. To determine the contextual and organisational issues that limit the successful adoption and integration of cloud technologies by the Nigerian SMEs.

All the objectives aim at revealing the correlation between technological use and the concrete operation results and considering infrastructure, fighting digital illiteracy, and organisational preparedness.

2.0 Literature Review

2.1 Conceptual Framework

2.1.1 Cloud Computing

Cloud computing refers to the supply of computing services, i.e., storage, processing power, software applications and networking over the internet-based platforms on the model of payment based on usage. The definition that has been used widely is by Mell and Grance (2011) which defines cloud computing as on-demand access to a common pool of configurable resources that can be rapidly provisioned with very little management efforts. Although this definition is still fundamental, later scholarship has

moved the emphasis away, to the implications of technical architecture to organisational ones.

The most common three models of cloud services include Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). SaaS allows companies to use applications like accounting, payroll and customer-management applications without the need to install them locally. PaaS enables applications to be developed without physical management of infrastructure while IaaS enables virtualisation of computing resources on demand. These models vary in terms of control and complexity, but the common denominator is that they all create reduced reliance on physical infrastructure.

The further results of deployment models are public, private, and hybrid. Public clouds are cheap, yet not customisable, whereas private clouds are expensive, yet highly controllable; hybrid arrangements are an effort to compromise between the two. Public and hybrid models prevail in the case of Nigerian SMEs due to the financial reasons, which however, brings up the issue of data security and regulations (Odufuwa et al., 2023).

2.1.2 Operational Efficiency

Operational efficiency is the degree to which an organisation transforms the inputs to outputs with minimum waste, cost as well as delay without compromising service quality. It does not mean cost reduction in itself. Obeng and Boachie (2021) state that efficiency is a coordinated use of labour, capital, time, and information. To SMEs, efficiency does not

pertain to large scale optimisation but rather to survival.

Slack et al. (2022) relate the operational efficiency to stability of the process, shorter time of cycle, and proper information flow. Inefficiency is often interrupted in developing economies by unstable infrastructures, discontinuity of workflow and small managerial bandwidth. Nigerian SMEs often use a manual record-keeping system and isolated systems, which enhance error rates and slows the decision-making process (Ojo and Yusuf, 2023).

Cloud computing is able to mediate in such situations by allowing automation, real-time data availability, and cross-functional alignment. SMEs can use cloud-based accounting tools, inventory, and collaboration tools to monitor the performance in real-time and react faster to operational problems (Ogunleye and Bamidele, 2022). These gains are however disproportionate; unless other skills are provided and their connectivity maintained, then efficiency gains will still be partial.

2.1.3 Cloud Computing and Operational Efficiency.

The connection between cloud computing and operational performance is intuitively, empirically lopsided. Cloud solutions save capital spending through ownership substitution with subscription and are also scalable, so that the firm can add and remove capacity to demand without unnecessary capacity (Nwankwo and Eze, 2021). These processes have direct influence on cost efficiency.

In addition to cost, the cloud systems promote the automation of workflow. Automatisations of routine tasks can be data entry, reporting, scheduling and can be performed with minimum human participation. Research associates this automation with a decrease in the processing time and errors (Olaniyi and Aderibigbe, 2024). Another way to enhance decision-making is by letting managers have access to real-time analytics and integrated dashboards.

The effect of efficiency is, however, conditional. Cloud tools are not well used where adoption is based on imitation in lieu of strategic fit. Nigerian SMEs tend to use simple storage or communication services and overlook attributes of analytics and automation that can produce greater efficiency improvements (Akinwale and Alabi, 2022). This adoption and utilisation gap makes it difficult to make claims regarding impact on performance.

2.2 Theoretical Framework

This study adopts the Technology-Organisation-Environment (TOE) framework as its primary analytical lens for examining the relationship between cloud computing and operational efficiency among Nigerian SMEs. TOE is particularly appropriate because it does not treat technology adoption as an isolated technical decision. Instead, it situates technology use within organisational capacity and environmental conditions, factors that consistently shape SME performance in Nigeria.

Rather than assuming that cloud computing automatically produces efficiency gains, the

TOE framework allows this study to interrogate how and under what conditions such gains emerge. This is crucial in contexts where infrastructural instability, uneven skills, and regulatory ambiguity remain persistent.

2.2.1 Technological Context

Within the TOE framework, the technological context refers to the perceived characteristics and functional attributes of cloud computing as experienced by SMEs. In this study, this includes cost flexibility, scalability, automation potential, real-time data access, and system reliability.

For Nigerian SMEs, these technological attributes are often the primary motivation for adoption. Pay-as-you-go pricing, reduced capital expenditure on hardware, and access to cloud-based applications lower entry barriers for firms operating with limited financial buffers. However, technological availability does not equate to technological effectiveness. When cloud services are used narrowly (primarily for storage or basic communication) their capacity to improve workflow coordination and productivity remains constrained. The technological context therefore explains potential efficiency, not realised outcomes.

2.2.2 Organisational Context

The organisational context captures internal conditions that determine whether technological potential translates into operational improvement. These include managerial commitment, employee digital competence, workflow integration, and organisational readiness for process change.

In many Nigerian SMEs, cloud tools coexist with manual processes rather than replacing

them. Limited technical skills and fragmented task structures reduce the extent to which automation, analytics, and real-time collaboration are embedded into daily operations. As a result, efficiency gains remain incremental. Neutral responses observed in efficiency indicators are interpreted in this study as evidence of partial organisational alignment rather than absence of benefit.

This perspective aligns with evidence that SMEs experience greater efficiency improvements only when cloud adoption is accompanied by staff training and process redesign. Organisational capacity therefore functions as a moderating factor, shaping both the intensity and sustainability of cloud-enabled efficiency.

2.2.3 Environmental Context

The environmental context refers to external conditions that enable or constrain effective cloud utilisation. For Nigerian SMEs, these conditions include internet reliability, data security concerns, subscription cost volatility, regulatory clarity, and general awareness of cloud capabilities. Despite increasing broadband coverage in Lagos, connectivity instability continues to disrupt cloud-dependent workflows. Security concerns—particularly around data protection and vendor trust—further limit the migration of core business functions to cloud platforms. Additionally, subscription pricing models denominated in foreign currency expose SMEs to exchange-rate risk, weakening long-term adoption confidence.

These environmental constraints do not prevent adoption outright but dilute operational gains. The study therefore treats

environmental factors as suppressors of efficiency rather than barriers to access.

2.2.4 Supporting Perspectives: Diffusion of Innovation and Resource-Based View

Diffusion of Innovation theory is used in this study only to contextualise variation in adoption intensity across firms. Differences in managerial perception, exposure to digital ecosystems, and peer influence help explain why cloud use remains uneven, even within the same geographic location. The Resource-Based View provides a complementary explanation for why cloud computing does not automatically confer competitive advantage. Cloud infrastructure, by itself, is widely accessible and easily replicated. Efficiency gains arise only when firms develop complementary human skills and organisational routines that allow cloud tools to be absorbed into operational practice. Both perspectives support, but do not replace the TOE framework. They assist in interpreting observed patterns without fragmenting the study's analytical focus.

2.3 Empirical Review

The empirical research of developed economies is always showing positive correlations between the use of clouds and the efficiency of operations. Post cloud migration, European and North American SMEs document decreases in IT spending, enhanced workflow organization, and a quicker decision-making process (Marston et al., 2020). Developing economies have their evidence that is more prudent. Research in India, South Africa, and Nigeria affirm that efficiency can be gained but also stress that various factors need to be moderated, including connectivity, skills, and security concerns (Adewale and Ojo, 2023).

The particular area of Nigerian work is centered on adoption intention to a significant extent compared to the actual performance results.

This imbalance leaves a gap. There is limited empirical work that directly links cloud computing to operational efficiency indicators: cost utilisation, workflow speed, and decision quality, within Nigerian SMEs. The study addresses this gap by shifting attention from perceived benefits to observable outcomes, grounded in local operational realities.

3.0 Research Methodology

The current research has used a descriptive survey research design to find out the relationship between the use of cloud computing and operational efficiency in small and medium-sized enterprises (SMEs). The collection of empirical data took place in Lagos State, Nigeria, which is a region of great concentration of SMEs, relatively developed digital infrastructure, and which plays a centralized role in the commercial activity of the country.

The target population included registered SMEs in Lagos State. A purposive sampling method was used in the selection of the firms that actively used cloud-based services and those that are not using cloud-based computing. The respondents were either owners, managers, or senior personnel with adequate knowledge of the operations and information system of organisations.

A structured questionnaire was used to collect data and the questionnaire covered demographic traits, usage of cloud computing and indicators of efficiency of the operations.

The responses of items were registered through a Likert-type scale. An expert review to determine content validity produced satisfactory internal consistency coefficients, whereas reliability testing produced satisfactory internal consistency coefficients. The questionnaires were directly given to the respondents and filtered in terms of completeness before they were analysed statistically.

To summarise respondent characteristics and the pattern of the use of clouds, descriptive statistics were used. To conduct all statistical analyses, proper software packages were used. This study does not make a judgement on causal relationships between cloud computing and operational efficiency. The methodology used in the analysis is descriptive and interpretative based on self-reported measurements of SME owners, managers and the top personnel utilizing the cloud-based services already. The results are therefore perceptions of the post adoption results and not real performance changes as measured.

Although these perceptions provide useful understanding of how cloud tools are used in the day-to-day operations, they cannot be interpreted as a direct or consistent efficiency impact. The research is highly sensitive to this limit, viewing the findings in the context of the overall organisation and environment, rather than the effect they have.

4.0 Results and Discussion of Findings

4.1 Cloud Computing and Cost Efficiency

Table 2: Cloud Computing and Cost Efficiency

Statement	Strongly Dis-Agree (Freq, %)	Dis-Agree (Freq, %)	Neutral (Freq, %)	Agree (Freq, %)	Strongly Agree (Freq, %)
Cloud computing has reduced the cost of purchasing and maintaining hardware.	72, 18.9%	68, 17.9%	76, 20.0%	82, 21.6%	82, 21.6%
Using cloud services has lowered software licensing costs.	70, 18.4%	74, 19.5%	75, 19.7%	80, 21.1%	81, 21.3%
Cloud solutions have reduced IT staff overhead costs.	69, 18.2%	73, 19.2%	78, 20.5%	79, 20.8%	81, 21.3%
Cloud computing allows my business to scale without major capital investment.	72, 18.9%	71, 18.7%	76, 20.0%	81, 21.3%	80, 21.1%
Cloud services have improved financial management through pay-as-you-go options.	68, 17.9%	74, 19.5%	75, 19.7%	81, 21.3%	82, 21.6%

Table 2 illustrates how cloud computing is technologically attractive to the SMEs in Nigeria. The responses are moderate in all indicators relating to cost, such as the acquisition of hardware, software licensing, staffing IT, scalability, and pay-as-you-go pricing. This trend suggests that cloud computing reduces the barrier to entering the digital infrastructure by replacing capital expense with operating expense that is flexible.

However, the non-dominance of agreement in items is analytically meaningful. Cost efficiency gains seem to be limited instead of

being widespread. This is the truth of cloud adoption among most SMEs: the process of migration is biased and the firms have continued with hybrid systems, which water down economies of scale. In conditions where only the storage services or simple applications are limited to the cloud services, hardware savings are combined with continued spending on the old systems.

Technologically, cloud computing does not provide cost elimination, but rather cost flexibility. Accordingly, the results indicate that possible efficiencies will be hidden within the technology, but they will be brought to

fruition in an uneven manner, contingent upon the degree of system migration

4.2 Cloud Computing and Productivity / Workflow Automation

Table 3: Cloud Computing and Productivity / Workflow Automation

Statement	Strongly Dis-Agree (Freq, %)	Dis-Agree (Freq, %)	Neutral (Freq, %)	Agree (Freq, %)	Strongly Agree (Freq, %)
Cloud computing has improved collaboration and teamwork.	70, 18.4%	69, 18.2%	77, 20.3%	82, 21.6%	82, 21.6%
Cloud tools have reduced delays in business processes.	68, 17.9%	74, 19.5%	76, 20.0%	81, 21.3%	81, 21.3%
Cloud applications enhance real-time task management.	69, 18.2%	71, 18.7%	77, 20.3%	81, 21.3%	82, 21.6%
Automation through cloud services has minimized manual errors.	72, 18.9%	70, 18.4%	75, 19.7%	81, 21.3%	82, 21.6%
Cloud technology has increased overall staff productivity.	69, 18.2%	73, 19.2%	75, 19.7%	81, 21.3%	82, 21.6%

Table 3 points at the organisational conditions influencing the productivity outcomes. The moderate consensus between collaboration, task management, automation, and error reduction indicates that cloud tools are becoming increasingly popular in the everyday processes. However, the improvements in productivity are marginal.

This trend portrays insufficient organisational absorption. Clouds applications are present in most of the SMEs with unstructured reporting lines and sub-systemic workflows. Automation aspects ease certain bottlenecks but do not

reorganize operations overall. Thus, productivity gains are realized on the task level than on the system level.

The fact that neutral responses occur in all productivity indicators must be as an indication of organisational readiness imbalance. Companies that have higher managerial control and employee capability are better placed to incorporate the use of cloud tools into their daily operations, as compared to those that undertake functional gains without significant operation change.

4.3 Cloud Computing and Data Accessibility / Decision-Making

Table 4: Cloud Computing and Data Accessibility / Decision-Making

Statement	Strongly Dis-Agree (Freq, %)	Dis-Agree (Freq, %)	Neutral (Freq, %)	Agree (Freq, %)	Strongly Agree (Freq, %)
Cloud services provide real-time access to business data.	70, 18.4%	71, 18.7%	75, 19.7%	81, 21.3%	83, 21.8%
Cloud computing enhances information sharing across departments.	69, 18.2%	72, 18.9%	76, 20.0%	80, 21.1%	83, 21.8%
Access to cloud data supports quicker decision-making.	68, 17.9%	73, 19.2%	75, 19.7%	81, 21.3%	83, 21.8%
Cloud storage improves data backup and recovery.	70, 18.4%	70, 18.4%	75, 19.7%	81, 21.3%	84, 22.1%
Cloud-based analytics support strategic planning.	71, 18.7%	70, 18.4%	76, 20.0%	80, 21.1%	83, 21.8%

Table 4 summarises the results at the cumulative of the technology ability and organisational application. The level of agreement tells that cloud platforms increase real-time data retrieval, information sharing, and backup of data functions directly correlated with cloud architecture.

The benefits of decision-making are however determined by organisational ability to interpret. Although the availability of real-time data is an accepted fact, more sophisticated analytical application is still

minimal. Instead, neutral answers to the question on cloud-based analytics show that the availability of data does not necessarily translate into strategic knowledge.

This vacuum indicates organisational limitations and not technological. Cloud systems offer tools of analysis and most SMEs do not have the dexterity or habits to incorporate analytics into planning and forecasting. As a result, the process of decision making is maintained as an operation but not strategic.

4.4 Barriers to Cloud Computing Adoption

Table 5: Barriers to Cloud Computing Adoption

Statement	Strongly Dis-Agree (Freq, %)	Dis-Agree (Freq, %)	Neutral (Freq, %)	Agree (Freq, %)	Strongly Agree (Freq, %)
Concerns about data security limit cloud use.	74, 19.5%	72, 18.9%	74, 19.5%	80, 21.1%	80, 21.1%
Unstable internet connectivity hinders effective use.	70, 18.4%	70, 18.4%	74, 19.5%	82, 21.6%	84, 22.1%
Limited technical expertise affects adoption.	68, 17.9%	72, 18.9%	75, 19.7%	82, 21.6%	83, 21.8%
Subscription costs discourage usage.	71, 18.7%	70, 18.4%	75, 19.7%	81, 21.3%	83, 21.8%
Lack of awareness about benefits reduces adoption.	69, 18.2%	73, 19.2%	76, 20.0%	80, 21.1%	82, 21.6%

Table 5 predicts some environmental conditions that mediate all the observed results. The presence of consensus in areas of security, instability of the internet, price of subscriptions, lack of technical knowledge and awareness has ensured that the limitations are not attitudinal but structural.

Poor connectivity weakens cloud system real time benefits by forcing companies to go offline. Security issues deter the migration of core processes and the use of subscription

costs which in many cases are in foreign currency creates financial uncertainty. These states do not inhibit adoption but stifle depth of use.

Cloud computing exists in weak support systems in an environmental perspective. The level of efficiency achieved is thus vulnerable to external factors outside organisational control

4.5 Overall Operational Efficiency

Table 6: Overall Operational Efficiency

Statement	Strongly Dis-Agree (Freq, %)	Dis-Agree (Freq, %)	Neutral (Freq, %)	Agree (Freq, %)	Strongly Agree (Freq, %)
Cloud computing has improved overall operational performance.	68, 17.9%	71, 18.7%	75, 19.7%	82, 21.6%	84, 22.1%
My organization delivers services faster with fewer resources.	70, 18.4%	72, 18.9%	74, 19.5%	80, 21.1%	84, 22.1%
Cloud solutions improved customer satisfaction.	69, 18.2%	73, 19.2%	75, 19.7%	81, 21.3%	82, 21.6%
The business responds more effectively to market changes.	70, 18.4%	70, 18.4%	76, 20.0%	82, 21.6%	82, 21.6%
Cloud computing has enhanced our competitive advantage.	68, 17.9%	72, 18.9%	75, 19.7%	82, 21.6%	83, 21.8%

Table 6 is not to be understood as a result on its own but rather the integrated impact of technological affordances, organisational capacity and environmental limitations. The reason is moderate consensus in all performance, responsiveness, customer satisfaction, and competitiveness parameters, which prove that cloud computing positively affects operations, although not in all cases and decisively.

Operational efficiency occurs when technological tools conform to organisational routine when there are relatively stable

environmental conditions. In case this alignment is low, partial improvements are made. The stable balance between the indicators indicates this interaction instead of the ambiguity in measurements.

Altogether, the findings prove that cloud computing makes operational efficiency among Lagos SMEs conditional. Technology provides the opportunity; organisation provides how it is used; environment provides limits to what can be done. Therefore, efficiency is not an intrinsic property of adoption, but a relation.

5.0 Findings, Conclusion and Recommendations

5.1 Findings

Firstly, the level of uptake of cloud computing among the surveyed SMEs was more or less high. More than three quarters of the surveyed individuals indicated that they used at least one type of cloud service, although cloud storage and cloud-based applications were the most prevalent. This implies that cloud computing is no longer experimental, but is currently integrated in at least an entry-level manner into the day-to-day business activities.

Second, the results associated with cost effectiveness show that cloud computing leads to decreased spending on hardware, software licensing and maintaining IT. Another important point that respondents made was the importance of the pay-as-you-go model in ensuring scalability is not required through heavy capital expenditure. But the existence of neutral responses indicates that cost benefits are not homogenous and vary depending on the scope of system migration and utilization.

Third, findings indicate cloud computing enhances efficiency and productivity with regard to workflow. It was reported that respondents collaborated better, there was less operational delay, better task management and less manual errors. These returns are observed to be incremental and not absolute; they represent differences in the competence of the staff and the intensity of cloud integration.

Fourth, the research discovered that cloud computing increases accessibility of data and

facilitates faster decision-making. Key benefits were the ability to access organisational data in real time, enhancement of information sharing and backup of data. However, sophisticated analytics functionality has not been fully exploited in most companies. To sum up, although these advantages exist, there are still a number of obstacles that prevent successful adoption of the cloud. The issue of data security, unreliable internet connectivity, lack of technical skills, subscription fees and poor awareness were all cited as the key limiting factors. These are some reasons why the gains in efficiency are not uniform among firms.

5.2 Conclusion

The current study evaluated how cloud computing adoption relates to the efficiency of operations in the small and medium enterprise (SME) sector of Lagos State in Nigeria. The results suggest that cloud computing leads to the enhancement of cost management, workflow control, access to information, and managerial decision-making. However, these improvements are uneven and mostly only incremental as opposed to transformative.

Considered in the context of the Technology-Organisation-Environment framework, cloud computing is an enabling infrastructure that has advantages based on organisational preparedness and the stability of the environment. Such technological properties as scaling and real-time access to data create the possibility of efficiency improvements, but only in case cloud tools are embedded in fundamental operational procedures and under the condition of sufficient human-resource capacity. In the case of poor organisational

alignment, the result of adoption is a little change in operations.

There are also environmental constraints, which moderate outcomes. Unreliable internet connexions, security of data and pressures on subscription costs do not exclude the use of the cloud but constrain the extent and reliability of efficiency benefits. These circumstances contribute to the fact that the reported outcomes remain neutral, even with rather high adoption levels.

As a result, it is possible to come to the conclusion of the study that under certain organisational and external circumstances, cloud computing can optimise the work of Nigerian SMEs. The productivity benefits are a result of the interplay between technological affordances, organisational capacity, and external support systems, and refute the claims of cloud adoption as an independent approach to SME performance.

5.3 Recommendations

The results show that, to enhance the efficiency of SME operations with the help of cloud computing, it is necessary not only to adopt cloud computing, but the results are also determined by the integration, support, and maintenance of cloud tools.

At organisational level, the SME owners and managers are advised to incorporate cloud applications in major organisational operations like in accounting, stock management and customer-relationship management, as opposed to the isolated storage or communication. More likely to gain efficiency, the cloud tools will match the daily workflow and decision-making. Specific staff education

must then be based on application and workflow redesign so that employees can transform cloud functions into daily work operationalized value.

On the environmental and policy level, the reliability of infrastructure is also of great importance. The government and the telecommunication providers are to focus on stabilising the broadband to support SME clusters because intermittent connectivity will hinder the cloud-based operations. Cloud service companies are urged to embrace variable and regionally responsive pricing frameworks to reduce the effect of exchange-rate risk and subscription unpredictability.

Lastly, the industry associations and state agencies ought to reorient the perception of the masses not towards generic promotion but towards realistic guidance, regarding the issue of data-security as well as making it clear that particular cloud operations can aid operational activities. The targeted support would promote greater and more efficient utilisation of the cloud technologies by the SMEs.

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