Journal of Governance and Accountability Studies (JGAS)
ISSN 2774-6739, Vol 5, No 1, 2025, 1-16 https://doi.org/10.35912/jgas.v5i1.2529

Cloud accounting: strategic advantage for maximising Shareholder wealth in Nigeria's pharmaceutical sector

Ama Kalu Ikwuo[1], Adaku Chinonyerem Ukoha[2], Gilbert Ogechukwu Nworie[3*]
University of Calabar, Cross River State, Nigeria[1]
Nnamdi Azikiwe University, Awka, Anambra State, Nigeria[2]
Ebonyi State University, Abakaliki, Ebonyi State, Nigeria[3]
amakalu945@gmail.com[1], ukohaadaku@gmail.com[2], dulcisgil@gmail.com[3]

Article History
Received on 14 November 2024
1st Revision on 25 November 2024
2nd Revision on 10 January 2025
3rd Revision on 21 January 2025
Accepted on 31 January 2025

Abstract
Purpose: This study examines the effect of cloud accounting on shareholder wealth maximization among listed pharmaceutical firms in Nigeria. Specifically, this study examined the effect of cloud accounting software usage and cloud accounting software intensity on the return on equity of listed pharmaceutical firms in Nigeria.
Methods: An ex post factor research design was used in this study. A sample size of Five listed pharmaceutical firms in Nigeria were purposively sampled from a population of seven (7). Secondary data were sourced from the annual reports of firms from 2014 to 2023, covering a ten-year period. In addition to the descriptive analysis, model diagnoses such as multicollinearity, autocorrelation, heteroskedasticity, and normality tests were conducted to validate the model. Hypotheses testing was performed using estimates from robust least-squares regression at the 5% significance level.
Results: The findings indicate that while cloud accounting software usage significantly improves the return on equity of listed pharmaceutical firms in Nigeria (p-value = 0.0056), cloud accounting software intensity negatively affects the return on equity of listed pharmaceutical firms in Nigeria (p = 0.0147).
Limitations: This study's limitation is based on the fact that the findings cannot be generalized to other sectors apart from the Nigerian pharmaceutical sector.
Contributions: Based on the findings of the study, pharmaceutical firms in Nigeria should enhance their investment in cloud accounting software by regularly training their finance teams on the effective use of these systems to maximize the benefits of cloud accounting to improve shareholder value.
Keywords: *Cloud Accounting, Shareholder Wealth Maximisation, Cloud Accounting Software Usage, Cloud Accounting Software Intensity, Return on Equity*
How to Cite: Ikwou, A. K., Ukoha, A. C., & Nworie, G. O. (2024). Cloud accounting: strategic advantage for maximising Shareholder wealth in Nigeria's pharmaceutical sector. *Journal of Governance and Accountability Studies*, 5(1), 1-16.

1. Introduction

The rapid advancement of technology has significantly transformed the way businesses operate, particularly in financial management. One of the most notable developments in recent years has been the rise of cloud accounting software, which has redefined traditional accounting practices (Zhang, 2024). As companies increasingly seek efficient and cost-effective solutions to enhance their operations, cloud accounting is a compelling option. In today's business environment, effective cloud accounting usage is not merely an operational choice; it is a strategic necessity (Udochukwu, Okorafor, &

Nwankwo, 2024). The increasing complexity of financial regulations and demand for real-time financial reporting have made traditional accounting methods less viable. Mistry, Mavani, Goswami, and Patel (2024) posited that cloud accounting software offers numerous advantages, including automation, scalability, and accessibility. These features enable businesses to manage their finances more effectively and to make data-driven decisions. Furthermore, the ability to access financial data from anywhere and at any time fosters collaboration among stakeholders, thereby enhancing the overall business agility. As firms face the challenges of a globalized market, those that embrace cloud accounting are better positioned to respond swiftly to changing circumstances, ultimately contributing to improved performance and shareholder satisfaction (Nduokafor, Ukoh, & Nworie, 2024).

According to Udochukwu et al. (2024), cloud accounting encompasses a range of online accounting services hosted on the cloud, allowing businesses to manage their financial transactions, reporting, and analyses through Internet-based platforms. Unlike traditional accounting systems that require on-premise installations, cloud accounting solutions enable users to access their financial data remotely, facilitating greater flexibility and efficiency. The key concepts associated with cloud accounting include real-time data processing, automated updates, and integration with other business applications. These features not only reduce the time and resources spent on accounting tasks, but also improve accuracy and reduce the risk of errors. Moreover, cloud accounting allows firms to scale their operations easily, adapting to changing business needs without significant upfront investments in infrastructure (Al-Mutawa & Al Mubarak, 2023). This modern accounting approach is particularly relevant in industries such as pharmaceuticals, where rapid changes in market dynamics necessitate agile financial management.

Mulyani (2023) observed that shareholder wealth maximization is a fundamental goal of publicly listed companies, reflecting the drive to increase stock prices and dividends. Effective cloud accounting plays a pivotal role in achieving this objective. By streamlining financial processes and providing timely insights into financial performance, cloud accounting enables companies to make informed strategic decisions that enhance profitability. For instance, with real-time access to financial data, management can identify cost-saving opportunities, optimize resource allocation, and respond more effectively to market demand. Additionally, the increased transparency and accuracy afforded by cloud accounting can improve investor confidence, potentially leading to higher stock valuation. In the pharmaceutical sector, where R&D investments and regulatory compliance are critical, the ability to effectively manage financial resources can directly influence a firm's market position and shareholder returns.

However, despite the growing recognition of its advantages, many companies still rely on traditional accounting methods, which are often cumbersome, time-consuming, and prone to errors (Rawashdeh, Rawashdeh, & Shehadeh, 2023). This reluctance to fully embrace cloud-based solutions can stem from various factors, including lack of awareness, inadequate technical infrastructure, and concerns about data security. Consequently, many organizations miss out on the strategic advantages offered by cloud accounting, which can hinder their ability to respond swiftly to market changes and regulatory demands (Hamzah, Suhendar, & Arifin, 2023).

Consequently, firms that fail to adopt effective cloud accounting practices may experience inefficiencies in their financial operations, resulting in delayed reporting and suboptimal decision making. Such inefficiency can lead to increased operational costs and reduced market competitiveness. Moreover, a lack of transparency and timely financial hints can erode shareholder trust, potentially leading to lower stock valuations and diminished returns on investments. As shareholders seek to maximize their wealth, the inability of companies to harness the full potential of cloud accounting software poses a significant risk to their financial health and long-term sustainability. Therefore, understanding the effect of cloud accounting on shareholder wealth maximization is crucial to address these challenges and promote better financial practices within the pharmaceutical sector in Nigeria.

1.1 Objective of the study

This study examines the effect of cloud accounting on shareholder wealth maximization among listed pharmaceutical firms in Nigeria. The specific objectives were to examine the following:

1. Effect of cloud accounting software usage on the return on equity of listed pharmaceutical firms in Nigeria.
2. The extent to which cloud accounting software intensity affects return on equity of listed pharmaceutical firms in Nigeria.

2. Literature review

2.1 Conceptual Review

2.1.1 Cloud Accounting

Cloud accounting is a modern approach to financial management that utilizes cloud computing technology to deliver accounting services over the internet (Zhang, 2024). Unlike traditional accounting systems that rely on on-premises software and hardware, cloud accounting allows users to access financial data and applications remotely via a web browser or a mobile device (Hamzah et al., 2023). This paradigm shift has fundamentally transformed the way organizations handle accounting functions. By leveraging the cloud, businesses can securely store vast amounts of financial information without the need for extensive local storage infrastructure (Rawashdeh et al., 2023).

One defining feature of cloud accounting is its ability to provide real-time access to financial data. This means that stakeholders can view up-to-date information regarding financial performance, cash flow, and other key metrics at any time and location (Nduokafor et al., 2024). The convenience of accessing financial data on the go fosters greater collaboration among team members and facilitates timely decision-making. This real-time capability is particularly valuable in today's fast-paced business environment, where timely insights can significantly affect operational efficiency and strategic planning (Udochukwu et al., 2024).

Cloud accounting also enhances financial management flexibility. Organizations can easily scale their accounting solutions to meet changing business needs without incurring significant costs (Hamzah et al., 2023). For example, companies can add new users, features, or integration with other business applications as their requirements evolve. This scalability is particularly beneficial for businesses that experience rapid growth or seasonal fluctuations in demand.

Moreover, cloud accounting systems typically incorporate automatic updates and backups, which reduces the burden on internal IT resources and mitigates the risk of data loss (Rawashdeh et al., 2023). This ensures that companies always work with the latest software versions and security protocols, thereby enhancing the overall data integrity (Zhang, 2024). Additionally, the subscription-based pricing model commonly associated with cloud accounting reduces upfront capital expenditure, allowing organizations to allocate resources more effectively.

2.1.2 Cloud Accounting Software Usage

Cloud accounting software usage refers to the active engagement and application of cloud-based accounting solutions by businesses to manage financial operations (Nduokafor et al., 2024). This encompasses a variety of tasks such as bookkeeping, invoicing, payroll processing, and financial reporting. The utilization of such software signifies a shift from conventional manual accounting practices to automated and efficient processes that leverage the capabilities of cloud technology (Zhang, 2024). This transition is particularly relevant in today's business landscape, in which agility and adaptability are essential for success.

The extent of cloud accounting software usage can vary widely among organizations and is influenced by factors such as company size, industry, and the specific needs of the business. For instance, small and medium-sized enterprises (SMEs) may adopt cloud accounting to streamline their financial processes without the burden of significant IT overhead (Hamzah et al., 2023). By contrast, larger corporations might integrate cloud accounting solutions as part of a broader enterprise resource planning (ERP) system, linking various functions to create a cohesive financial management environment (Rawashdeh et al., 2023).

The effective usage of cloud accounting software involves not only the deployment of the technology but also the strategic integration of its features into daily operations (Udochukwu et al., 2024). Businesses must ensure that their staff is adequately trained to utilize the software, maximizing its potential to improve efficiency and accuracy in financial reporting. Moreover, the implementation of cloud accounting software can lead to a cultural shift within organizations, encouraging a data-driven approach to decision-making. As financial data becomes more accessible and easier to analyze, businesses can move away from reactive financial practices and toward proactive strategies that anticipate market changes and optimize financial performance (Nduokafor et al., 2024). Cloud accounting software usage encompasses the active and strategic employment of cloud-based solutions for financial management (Rawashdeh et al., 2023). By embracing these tools, organizations can enhance their operational efficiency, improve accuracy, and foster a culture of informed decision making, ultimately driving better financial outcomes.

2.1.3 Cloud Accounting Software Intensity

Cloud accounting software intensity refers to the degree to which cloud accounting solutions are integrated and utilized within an organization's overall financial management framework (Monteiro, Cepêda, Da Silva, & Vale, 2023), particularly in relation to its total assets. This concept highlights not only the presence of cloud accounting software but also its significance and impact on the organization's financial structure and performance. The intensity of use can be measured by various factors, including the percentage of financial processes handled through cloud accounting systems, frequency of software usage, and reliance on cloud solutions for critical financial decision-making.

Organizations with high cloud accounting software intensity typically demonstrate commitment to leveraging technology as a core component of their financial operations (Udochukwu et al., 2024). This may involve the use of cloud accounting solutions to manage a significant portion of their total assets, including cash management, accounts receivable, accounts payable, and financial reporting. The integration of these systems can enhance visibility into financial data, enabling organizations to make more informed decisions regarding resource allocation and investment strategies.

The intensity of cloud accounting software usage can also reflect an organization's willingness to adapt to technological advancements and embrace digital transformation. Companies that integrate cloud accounting solutions fully often experience improved operational efficiency and reduced costs associated with traditional accounting methods. Furthermore, a high intensity of usage can foster a culture of innovation, encouraging staff to seek additional cloud-based tools and services that can further enhance productivity and streamline workflows.

By contrast, organizations with low cloud accounting software intensity may struggle to realize the full benefits of cloud technology (Hamzah et al., 2023). This can result from a lack of commitment to technology adoption or insufficient training of employees on how to effectively use these systems. Such limitations can lead to fragmented financial processes, decreased visibility of financial performance, and, ultimately, hindered decision-making capabilities. Cloud accounting software intensity reflects the depth of integration and reliance on cloud solutions within an organization's financial management practices. By maximizing the use of cloud accounting systems, organizations can enhance their financial operations, drive efficiencies, and better align their resources with their strategic objectives.

2.1.4 Shareholder Wealth Maximization

Shareholder wealth maximization is a fundamental financial principle that guides the decision-making processes of publicly traded companies (Mulyani, 2023). This concept asserts that the primary objective of a company is to increase the value of its shares, thereby enhancing shareholder wealth. In practice, this means that management must make strategic decisions that not only focus on profitability but also consider the long-term growth and sustainability of the organization (Shuaibu & Mohammed, 2023). The emphasis on maximizing shareholder wealth stems from the idea that shareholders, as the owners of the company, should reap the financial benefits of their investments through increasing stock prices and dividends (Ma, Pan, & Suardi, 2024).

The pursuit of shareholder wealth maximization involves a careful balance between short-term financial performance and long-term strategic growth (Mulyani, 2023). Although immediate profitability is important, it should not come at the expense of future opportunities for growth or risk management (Ma et al., 2024). For instance, a company might invest in R&D, even if it reduces short-term profits, because such investments can lead to innovative products and services that enhance competitiveness and profitability in the long run. This approach reflects a commitment to sustainable growth and the recognition that shareholders' interests extend beyond immediate financial returns (Ray & Ghosh, 2023).

However, the pursuit of shareholder wealth maximization has been criticized. Some argue that an exclusive focus on shareholder interests may lead to the neglect of other stakeholders including employees, customers, and the community (Ma et al., 2024). This critique has led to discussions on the importance of corporate social responsibility and the need for companies to consider the broader implications of their business decisions. Despite these debates, the principle of shareholder wealth maximization remains a cornerstone of financial management and corporate governance, driving companies to enhance their financial performance and deliver value to shareholders (Mulyani, 2023).

2.1.5 Return on Equity

Return on Equity (ROE) is a critical financial metric used to assess a company's profitability relative to its shareholders' equity (Ray & Ghosh, 2023). This ratio indicates how effectively a company utilizes its equity base to generate profits. ROE is calculated by dividing net income by shareholder equity and is expressed as a percentage. A higher ROE signifies that a company generates more profit per dollar of equity invested, making it an essential indicator for investors to assess the efficiency of a firm's financial performance (Ichsani & Suhardi, 2015).

ROE is particularly useful in evaluating the performance of publicly traded companies because it reflects the return generated for shareholders and provides insights into management's effectiveness in deploying capital. As a result, investors often look for companies with consistently high ROE, as this can indicate a well-managed organization capable of generating sustainable profits over time (Ray & Ghosh, 2023).

Furthermore, ROE can be influenced by various factors including profit margins, asset turnover, and financial leverage. Companies can enhance their ROE through operational efficiencies that increase net income or by optimizing their capital structure to ensure an appropriate balance between debt and equity (Lusy, Hermanto, Panjaitan, & Widyastuti, 2018). However, it is essential to interpret ROE in the context of industry norms and the company's overall financial strategy. For instance, a very high ROE may raise concerns about sustainability, particularly if it is driven by excessive leverage, which could increase the financial risk.

2.2 Theoretical Framework and Development of Research Hypothesis

The resource-based Theory (RBT) originated in the early 1990s and is primarily attributed to the works of scholars such as Jay Barney, who articulated the framework in his seminal paper titled "Firm Resources and Sustained Competitive Advantage," published in 1991 (Nworie, Okafor, & John-Akamelu, 2022). This theory emerged as a response to the prevailing views of competitive advantage, which often emphasize external market factors. RBT shifted the focus to internal resources, asserting that a firm's unique capabilities and assets are critical in determining its ability to achieve and sustain competitive advantage over time (Barney, 1996).

The main postulations of Resource-Based Theory center on the idea that not all resources are created equally (Barney, Ketchen Jr, & Wright, 2021). To contribute to a firm's competitive advantage, it must meet four key criteria: valuable, rare, inimitable, and non-substitutable (often referred to as the VRIN framework). Valuable resources help firms exploit opportunities or neutralize threats in their environment; rare resources are not widely possessed by competitors; inimitable resources are difficult for rivals to replicate; and non-substitutable resources cannot be easily replaced by other resources. This

framework emphasizes that organizations should focus on developing and leveraging these unique resources to create and sustain competitive advantage, ultimately leading to superior performance and profitability (Nworie et al., 2022).

The relevance of Resource-Based Theory to cloud accounting software usage and shareholder wealth maximization lies in its emphasis on the strategic management of internal resources. Cloud accounting software serves as a critical resource that can enhance financial management capabilities of listed pharmaceutical firms in Nigeria. By effectively utilizing this technology, firms can streamline their accounting processes, improve data accuracy, and gain real-time insights into financial performance (Nworie & Okafor, 2023). This not only fosters better decision making but also enables companies to respond swiftly to market changes, thereby maximizing shareholder wealth. The application of RBT in this study highlights how unique capabilities derived from cloud accounting can lead to improved financial outcomes, reinforcing the idea that strategic resource management is essential for achieving competitive advantage and driving value for shareholders. Accordingly, we hypothesize that

1. Cloud accounting software usage improves the return on equity of listed pharmaceutical firms in Nigeria.
2. Cloud accounting software intensity also enhances the return on equity of listed pharmaceutical firms in Nigeria.

2.3 Empirical Review

Udochukwu et al. (2024) investigated the impact of cloud accounting costs on the financial performance of Nigerian deposit money banks by focusing on server maintenance costs, software acquisition costs, and return on assets. The study utilized an ex-post facto research design, sampling five deposit money banks. Data were collected from the annual financial statements of these banks from 2012 to 2022 and analyzed using multiple regression analysis with the E-view 9.0. The findings indicate that server maintenance costs positively affect financial performance, although this effect is not statistically significant. In contrast, software acquisition costs have a negative and insignificant impact on bank financial performance.

Al-Mutawa and Al Mubarak (2023) explored the adoption of cloud computing as a digital tool by small and medium enterprises (SMEs) and its influence on their sustainability. This study developed a model outlining factors affecting SME sustainability and gathered primary quantitative data through a survey, obtaining 387 responses via a convenience sampling method. The results showed that factors such as cost reduction, ease of use, reliability, and collaboration had significant positive effects on SME sustainability, whereas privacy and security did not have a significant statistical impact.

Nduokafor et al. (2024) analyzed how using cloud-based accounting software affects the prevention of business failure, focusing on the consumer goods sector of the Nigerian Exchange Group. The study utilized an ex post facto design on a purposive sample of 14 consumer goods firms. Data were obtained from audited financial statements and annual reports covering the period from 2012 to 2021. Descriptive statistics, including mean and standard deviation, were applied, and the hypotheses were tested using a robust least-squares regression. The findings highlight that cloud-based accounting software significantly reduces the chances of business failure. The study concludes that adopting modern technological solutions is vital for strengthening financial health and resilience.

Wisdom and Grace (2023) assessed the relationship between cloud accounting and Nigerian manufacturing companies' financial performance. Using an ex post facto design and panel data analysis of public financial statements from 2009 to 2018, six manufacturing firms were randomly selected for the study. The Random Effects regression method was employed for data analysis. The results revealed that maintenance costs had a significant negative effect on return on equity, with a 1% increase in maintenance costs leading to a 0.06% decrease in return on equity. The study emphasized that cloud accounting costs could hinder performance and advocate effective cost management systems to maintain profitability.

Gangadhara (2023) studied the relationship between cloud accounting costs and financial outcomes of firms in India. This study employed an ex-post facto approach and panel data analysis of financial statements from a nine-year period. Random Effects regression was used, and the findings indicated a significant negative effect of cloud accounting maintenance costs on return on equity, similar to observations made for Nigerian manufacturing firms.

Onifade, Shittu, Aminu, and Ajibola (2023) explored the impact of cloud accounting characteristics on the performance of listed food and beverage companies in Nigeria. This study used the Cost of Software (COSW), Cost of Risk (CORSK), and Cost of Training (COTR) as proxies for cloud accounting characteristics, while Return on Equity (ROE) and Market Value (MKV) were used as performance indicators. The population comprises all 23 food and beverage companies listed on the Nigerian Stock Exchange as of December 31, 2021. A purposeful sampling technique was applied to select 10 companies using secondary data from 2012 to 2021. Multiple regression analysis revealed that COSW had a negative and significant impact on ROE and MKV, whereas COTR had a positive and significant effect. The study concludes that COSW and COTR significantly influence the performance of these companies and recommends that companies manage training costs to maximize cloud accounting benefits.

DeStefano, Kneller, and Timmis (2023) analyzed firm-level data to investigate how cloud adoption affects firm performance and organizational structure using an instrumental variable approach, leveraging variations in fiber broadband speeds. The findings indicate that younger firms adopting cloud technology experienced growth in revenue, employment, and productivity, while incumbent firms did not show scale effects and had weaker productivity improvements. Incumbents, however, underwent restructuring marked by fewer establishment births and deaths, and firms of all ages experienced geographic shifts away from their headquarters.

Chen, Guo, and Shangguan (2022) studied the economic implications of cloud service adoption on firm performance by applying difference-in-differences models paired with propensity score matching. The analysis, covering listed firms worldwide from 2010 to 2016, demonstrated that cloud computing adoption positively impacted profitability and market value in both the short and long term, with varying degrees depending on firm size and industry.

Nezami, Tuli, and Dutta (2022) focused on the shareholder wealth effects of software firms transitioning to cloud computing from a marketing perspective. This longitudinal study included 435 publicly listed business-to-business (B2B) firms in the software and services industries. Using a value relevance model, the study found that unexpected increases in cloud revenue share positively affect excess stock returns and negatively influence idiosyncratic risk. These effects vary across market structures, with market maturity enhancing the positive impacts on stock returns and higher advertising intensity, intensifying the negative impact on idiosyncratic risk.

Abidde (2021) investigated the impact of cloud-based accounting on the financial performance of listed manufacturing firms on Nigerian Stock Exchange using an ex-post facto design. This study assessed the pre- and post-application impact of NetSuite on Return on Assets, Return on Equity, and Return on Capital Employed over the study period. The findings showed varied results, with some researchers noting significant positive implications and others observing negative impacts on financial performance.

2.4 Gap in Literature

While extensive research has been conducted on the effect of cloud accounting on various financial performance metrics, few studies have explicitly focused on shareholder wealth maximization within specific industry sectors, particularly among pharmaceutical firms in Nigeria. Udochukwu et al. (2024) examined cloud accounting costs in relation to Nigerian deposit money banks by analyzing server maintenance and software acquisition costs. Similarly, Wisdom and Grace (2023) explored the relationship between cloud accounting maintenance costs and return on equity in Nigerian

manufacturing companies, highlighting cost management as a key performance determinant. Gangadhara (2023) found a comparable negative impact of cloud maintenance costs on ROE in the Indian context, suggesting geographic and industry-specific effects. However, none of these studies have addressed the pharmaceutical sector, which faces unique cost structures and regulatory pressures that could influence the impact of cloud accounting on shareholder wealth. Additionally, studies such as those by Onifade et al. (2023), focusing on food and beverage companies, and Nduokafor et al. (2024) underscore the need for industry-specific analyses due to varied operational dynamics and financial requirements.

Most prior research has concentrated on general measures of financial performance, such as return on assets and return on equity, rather than explicitly linking cloud accounting to shareholder wealth maximization. For instance, Nezami et al. (2022) investigated the effect of cloud computing on shareholder wealth in B2B software firms; however, findings from technology-focused sectors may not be directly applicable to pharmaceuticals. Likewise, DeStefano et al. (2023) and Chen et al. (2022) provided evidence of cloud adoption's influence on firm growth and productivity, although neither focused on shareholder wealth implications specific to the pharmaceutical industry. Although Abidde (2021) and Al-Mutawa and Al Mubarak (2023) studied cloud computing adoption in manufacturing and SME sustainability, respectively, the nuanced impact of cloud accounting software usage and intensity on shareholder wealth in Nigeria's pharmaceutical sector remains unexamined, creating a gap in understanding the potential value that cloud technology may bring to shareholder wealth maximization in this industry.

3. Research Method

This study employs an ex post facto research design to examine the effect of cloud accounting software usage on the return on equity (ROE) of listed pharmaceutical firms in Nigeria. The choice of an ex-post facto design is justified as it facilitates the analysis of existing financial data without researcher intervention. This type of research design is particularly effective for exploring cause-and-effect relationships between events that have already occurred in the past (Nworie et al., 2022), such as the use and intensity of cloud accounting software and their impact on financial performance. This approach enables the investigation of historical data to draw conclusions on how cloud accounting adoption influences shareholder wealth. The population for this study consists of all pharmaceutical firms listed on the Nigerian Exchange Group (NGX) as of December 31, 2023. This includes firms that play a significant role in the pharmaceutical sector, representing a cross-section of both large- and mid-sized organizations. Population selection ensures that this study captures a comprehensive view of the sector's financial performance and its relationship with cloud accounting software usage. The pharmaceutical firms included in this study are listed in Table 1.

Table 1. Population of the Study

1.	Ekocorp Plc
2.	Fidson Healthcare
3.	May & Baker Nigeria Plc
4.	Mecure Industries Plc
5.	Morison Industries Plc
6.	Neimeth International Pharm
7.	Pharma-Deko Plc

Source: Nigerian Exchange Group (2023)

The sampling technique employed in this study is purposive sampling, which focuses on firms that have consistent and comprehensive financial data for the period 2014 to 2023. This method ensures that the firms included in the sample have detailed records of cloud accounting software usage and sufficient financial performance data. Firms with incomplete data were excluded to maintain the integrity of this study. Following this process, the final sample consisted of five listed pharmaceutical firms, as shown in Table 2. A purposive sampling approach was chosen to ensure the accuracy and reliability of the findings, emphasizing firms with relevant and complete data.

Table 2. Sample Size

1.	**Fidson Healthcare**
2.	**May & Baker Nigeria Plc**
3.	**Morison Industries Plc**
4.	**Neimeth International Pharm**
5.	**Pharma-Deko Plc**

Source: Researchers' Compilation (2024)

Secondary data sourced from the annual reports and audited financial statements of the selected pharmaceutical firms from 2014 to 2023 were used for this study.
The study variables include cloud accounting software usage, cloud accounting software intensity, and return on equity (ROE). These variables were defined and measured as follows:

Table 3. Operational Measurement of Variables

Variable	Measurement
Cloud Accounting Software Usage	Cost of cloud accounting software
Cloud Accounting Software Intensity	(Total cloud accounting expenditure / Total assets)
Return on Equity (ROE)	Net profit / Total shareholders' equity

Source: Researcher's Compilation (2024)

The data analysis involved both descriptive and inferential statistics. Descriptive statistics, such as means and standard deviations, provided a summary of the variables, while a robust least-squares regression model was used for inferential analysis. This regression model helps to account for potential outliers and ensures reliable parameter estimation. The significance of the model was tested at a 5% significance level, and the results were interpreted based on p-values to determine the statistical significance of cloud accounting usage and intensity on the ROE. The decision rule for this study was based on a significance level of 5 %. If the p-value of any variable is below 0.05, the null hypothesis is rejected in favor of the alternative, indicating a significant effect on the ROE. If the p-value is greater than 0.05, the null hypothesis is not rejected, suggesting no significant effect on the ROE. To evaluate the relationship between cloud accounting and shareholder wealth maximization (indexed by return on assets), the following econometric model was adopted:

$ROE_{it} = \beta_0 + \beta_1 CASU_{it} + \beta_2 CAI_{it} + \epsilon_{it}$ _____ eqi

Where:
ROE = Return on equity of firm *i* at time *t*
CASU = Cloud accounting usage (binary)
CAI = Cloud accounting intensity (percentage of total assets)
$\beta 0$ = Constant
$\beta 1$, $\beta 2$ = Coefficients of the model
ϵ = Error term
it = Firm *i* in year *t*

4. Results and discussions

4.1 Descriptive Analysis

Table 4 presents the descriptive analysis of the data.

Table 4. Descriptive Analysis

	ROE	***CASU***	***CASI***
Mean	-0.038985	10026.64	0.000767
Median	0.023410	0.000000	0.000000
Maximum	4.805528	92483.00	0.010860
Minimum	-2.576034	0.000000	0.000000
Std. Dev.	0.865033	18941.85	0.001862
Skewness	2.849628	2.429161	3.816224
Kurtosis	22.55015	9.410989	19.26898

Jarque-Bera	863.9371	134.8002	672.7794
Probability	0.000000	0.000000	0.000000
Sum	-1.949248	501332.0	0.038361
Sum Sq. Dev.	36.66580	1.76E+10	0.000170
Observations	50	50	50

Source: Eviews 10 Output (2024)

The **Return on Equity (ROE)**, as presented in Table 4. reflects the profitability of the listed pharmaceutical firms in Nigeria, with a mean value of approximately -0.039. This negative average indicates that overall, these firms do not generate profits relative to their shareholders' equity, which is concerning for investors. The maximum ROE of approximately 4.81 suggests that at least one firm has achieved a considerable return, significantly outperforming the average, while the minimum ROE of -2.58 indicates that some firms incur substantial losses. A standard deviation of 0.865 implies a high level of variability in profitability among firms, indicating that while some are doing well, many others struggle financially.

Cloud Accounting Software Usage (CASU) is also detailed in Table 4. measured the average expenditure on cloud accounting software, with a mean cost of approximately 10,027. This finding suggests that, on average, pharmaceutical firms in Nigeria invest a moderate amount of cloud accounting solutions. The maximum expenditure recorded is 92,483, indicating that certain firms may invest heavily in advanced cloud accounting systems, possibly correlating with a more sophisticated financial management approach. Conversely, a minimum expenditure of zero indicates that some firms may not utilize any cloud accounting software, which could impact their operational efficiency. The standard deviation of 18,942 signifies substantial variability in how much firms allocate to cloud accounting, suggesting differing levels of commitment to this technology across industries.

The Cloud Accounting Software Intensity (CASI) is presented in Table 4. as the ratio of the total cloud accounting expenditure to the total assets, yielding a mean value of approximately 0.000767. This low average suggests that relative to their total asset base, investment in cloud accounting is minimal across the firms studied. The maximum value of 0.01086 indicates that some firms allocate a relatively high proportion of their assets to cloud accounting, which may enhance their operational capabilities. However, the minimum value of 0 indicates that certain firms either do not invest in cloud accounting or have negligible expenses in this area, potentially limiting their financial management efficiency. The standard deviation of 0.001862 indicates a small variation in the intensity of cloud accounting investments relative to total assets, suggesting that while there are differences in investment levels, most firms exhibit a similarly low intensity in their cloud accounting usage relative to their overall asset base.

4.2 Model Diagnoses

Table 5. Correlational Analysis
Covariance Analysis: Ordinary
Date: 11/03/24 Time: 09:12
Sample: 1 50
Included observations: 50

Correlation Probability	ROE	CASU	CASI
ROE	1.000000 -----		
CASU	0.071920 0.6197	1.000000 -----	
CASI	-0.016050 0.9119	0.672307 0.0000	1.000000 -----

Source: Eviews 10 Output (2024)

In **Table 5**, the correlational analysis examines the relationships between Return on Equity (ROE) and two variables: Cloud Accounting Software Usage (CASU) and Cloud Accounting Software Intensity (CASI). The correlation coefficient for CASU was approximately 0.072 with a probability value of 0.6197, indicating a weak positive correlation that was not statistically significant. This suggests that changes in CASU do not have a meaningful relationship with ROE. By contrast, the correlation coefficient for CASI is -0.016, with a probability value of 0.9119, indicating a negligible negative correlation, which is also statistically insignificant. Overall, this table suggests that neither CASU nor CASI significantly influence the ROE of listed pharmaceutical firms in Nigeria.

Table 6. Multicollinearity Analysis

Variance Inflation Factors
Date: 11/03/24 Time: 09:10
Sample: 1 50
Included observations: 50

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
CASU	7.99E-11	2.346550	1.824807
CASI	8268.964	2.140787	1.824807
C	0.019898	1.291769	NA

Source: Eviews 10 Output (2024)

Table 6 presents the multicollinearity analysis through Variance Inflation Factors (VIF) for the variables CASU and CASI. Both variables showed a VIF of approximately 1.825, which is below the commonly accepted threshold of 10. This indicates no significant multicollinearity between CASU and CASI, suggesting that these variables can be included in the regression analysis without concern for inflated standard errors. The results imply that each variable independently contributes to explaining the variance in the dependent variable without being overly correlated.

Table 7. Test of Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.408613	Prob. F(2,45)	0.6670
Obs*R-squared	0.891832	Prob. Chi-Square(2)	0.6402

Source: Eviews 10 Output (2024)

In **Table 7**, the Breusch-Godfrey Serial Correlation LM Test assesses autocorrelation in the regression residuals. The reported probability value of 0.6670 suggests that there is no significant autocorrelation at conventional significance levels. This indicates that the residuals from the regression analysis were independent, which is an essential assumption for valid inferential statistics. This finding supports the reliability of the regression results in the context of this study.

Table 8. Test of Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.289895	Prob. F(2,47)	0.7497
Obs*R-squared	0.609282	Prob. Chi-Square(2)	0.7374
Scaled explained SS	6.059752	Prob. Chi-Square(2)	0.0483

Source: Eviews 10 Output (2024)

Table 8 shows the results of the Breusch-Pagan-Godfrey test for heteroscedasticity. A probability value of 0.7497 indicates a lack of significant heteroskedasticity among the residuals. This result implies that the variance of the residuals is constant across observations, aligned with the assumptions required for ordinary least squares (OLS) regression analysis. Therefore, the findings suggest that the model's estimations are robust and not affected by varying degrees of error across different levels of independent variables.

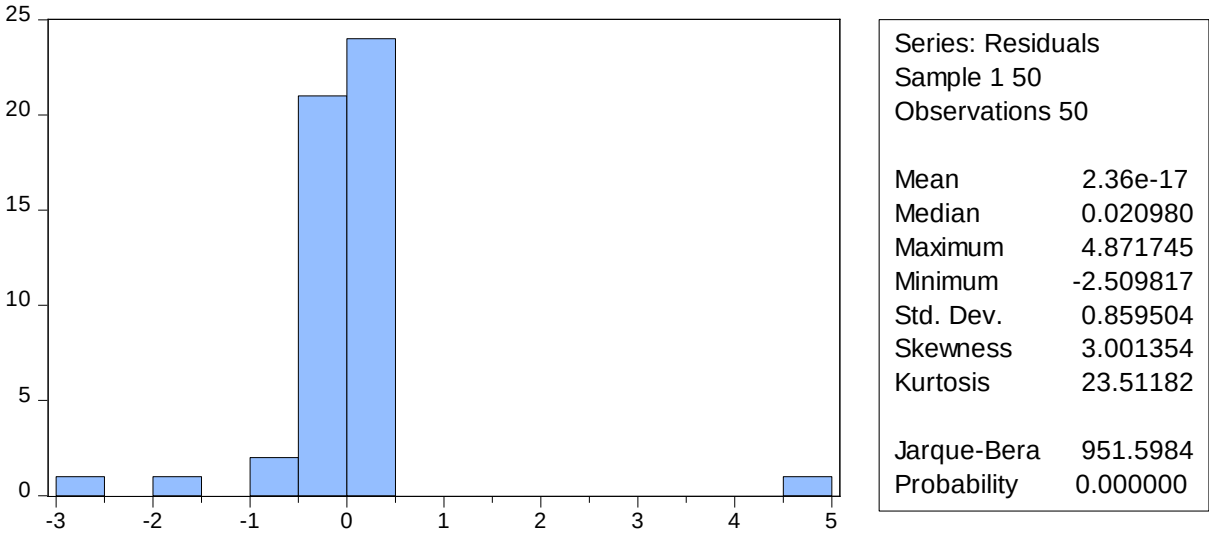

Figure 1. Normality Test
Source: Eviews 10 Output (2024)

In **Figure 1**, the normality test results from the Jarque-Bera test show a p-value of 0.00000. This extremely low p-value indicated a significant deviation from normality in the distribution of the data. A non-normal distribution could affect the validity of the statistical inferences made from the analysis. Robust least-squares regression was employed in this study to address the potential issues of non-normality in the data distribution. Unlike ordinary least squares (OLS) regression, which is highly sensitive to outliers and deviations from normality, robust regression techniques provide more reliable parameter estimates by minimizing the influence of outliers and ensuring that the results remain valid even when the assumption of normality is violated. This approach enhances the robustness of the analysis, making the findings more dependable for examining the effect of cloud accounting on shareholder wealth maximization among listed pharmaceutical firms.

4.3 Test of Hypotheses

The output from the robust least-squares regression is presented in Table 4.6.

Table 9. Robust Least Square Regressions
Dependent Variable: ROE
Method: Robust Least Squares
Date: 11/03/24 Time: 09:08
Sample: 2014 2023
Included observations: 50
Method: M-estimation
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
CASU	0.00000638	2.30E-06	2.771750	0.0056
CASI	-57.12968	23.42360	-2.438979	0.0147

C	-0.034199	0.036336	-0.941194	0.3466
	Robust Statistics			
R-squared	0.103025	Adjusted R-squared		0.064856
Rw-squared	0.224928	Adjust Rw-squared		0.224928
Akaike info criterion	77.88271	Schwarz criterion		85.01262
Deviance	2.833812	Scale		0.196654
Rn-squared statistic	8.286999	Prob(Rn-squared stat.)		0.015867

Source: Eviews 10 Output (2024)

The results from Table 9, which outlines the robust least squares regression analysis, examine the effects of Cloud Accounting Software Usage (CASU) and Cloud Accounting Software Intensity (CASI) on the Return on Equity (ROE) of listed pharmaceutical firms in Nigeria. An R-squared value of approximately 0.103025 indicates that approximately 10.3% of the variability in the ROE can be explained by the independent variables in the model. This relatively low R-squared value suggests that while cloud accounting practices contribute to understanding ROE, a significant portion of its variability remains unaccounted for by the model. This implies that there are other influential factors outside CASU and CASI that affect the ROE.

Focusing on the probability of the Rn-squared statistic, which is 0.015867, we see that this value is below the conventional significance threshold of 0.05. This indicates that the overall regression model is statistically significant, suggesting that at least one of the independent variables, either CASU or CASI, significantly affects ROE. Thus, we accept the alternate hypothesis that cloud accounting usage and intensity predict shareholder wealth maximization.

The constant term (C) is -0.034199; however, its probability value of 0.3466 indicates that it is not statistically significant. This suggests that when both CASU and CASI are zero, ROE does not provide a meaningful estimate, as a high p-value indicates that this result lacks statistical reliability.

4.3.1 Test of Hypothesis I

H01) The effect of cloud accounting software usage on the return on equity of listed pharmaceutical firms in Nigeria is insignificant.

Table 9 shows that the coefficient of Cloud Accounting Software Usage (CASU) is reported as 0.00000638. This coefficient signifies that for each unit increase in CASU, ROE increases by approximately 0.00000638. This represents a marginally positive effect, implying that increased expenditure on cloud accounting software leads to a slight enhancement in financial performance, as measured by ROE. An associated probability value of 0.0056 indicates that this effect is statistically significant, as it is well below the threshold of 0.05. Therefore, we accept the alternate hypothesis and conclude that cloud accounting software usage significantly improves the return on equity of listed pharmaceutical firms in Nigeria (p-value = 0.0056).

4.3.2 Test of Hypothesis II

H02) The effect of cloud accounting software intensity on return on equity of listed pharmaceutical firms in Nigeria is not significant.

In contrast, the Cloud Accounting Software Intensity (CASI) exhibits a coefficient of -57.12968, which indicates that for each unit increase in CASI, the ROE decreases by approximately 57.13. This large negative coefficient reflects a substantial marginal effect, suggesting that, as firms invest more heavily in cloud accounting relative to their total assets, their ROE declines significantly. A probability value of 0.0147 confirms that this effect is statistically significant, being below the level of 0.05. Consequently, we assert that the effect of CASI on ROE is negative and significant. Having accepted the alternate hypothesis, cloud accounting software intensity negatively affects the return on equity of listed pharmaceutical firms in Nigeria (p-value = 0.0147).

4.4 Discussion of Findings

The positive and significant effect of Cloud Accounting Software Usage (CASU) on ROE suggests that the integration of cloud accounting technology can enhance firms' financial performance by improving operational efficiencies and reducing manual workloads. This finding aligns with the study by Chen et al. (2022), which demonstrated that cloud computing adoption positively impacts firm profitability and market value across various industries, indicating the broad applicability of such technologies to enhance financial outcomes. Similarly, DeStefano et al. (2023) highlight that younger firms experienced revenue growth and productivity gains through cloud adoption, showing that cloud accounting can drive positive financial performance. Moreover, Nezami et al. (2022) supported this by revealing that cloud revenue share increases lead to positive stock returns for software firms, underscoring the shareholder wealth benefits linked to cloud accounting software usage. However, Udochukwu et al. (2024) reported that server maintenance costs, a component of cloud infrastructure, positively affected financial performance, albeit insignificantly, hinting at potential indirect benefits that align with the positive results observed here.

Conversely, the negative and significant effect of Cloud Accounting Software Intensity (CASI) on ROE suggests that overemphasis or excessive allocation of resources toward cloud accounting can burden firms with costs that outweigh the benefits. Wisdom and Grace (2023) found that maintenance costs associated with cloud accounting had a significant negative effect on ROE in Nigerian manufacturing firms, indicating that high expenditures in this area could erode profitability. This notion was further echoed by Gangadhara (2023), whose research indicated a similar negative impact of cloud maintenance costs on the ROE of Indian firms, reinforcing the idea that heavy financial investments in cloud infrastructure can have diminishing returns. Onifade et al. (2023) also highlighted that the cost of cloud software (COSW) negatively affects the performance of food and beverage companies, suggesting that high software-related expenses can undermine profitability. Finally, Abidde (2021) noted mixed results when assessing the influence of cloud-based accounting on financial performance, demonstrating that while benefits exist, the associated costs can sometimes counteract the positive impacts, especially when the investment intensity is high.

5. Conclusion

In a perfect business setting, organizations utilize cutting-edge technologies, including cloud-based accounting solutions, to improve their financial management practices and boost their operational performance. This technology was designed to provide real-time insights into financial performance, automate routine tasks, and enable seamless collaboration among stakeholders. By adopting cloud accounting, organizations can make informed decisions that drive growth, increase profitability, and maximize shareholder wealth. In this context, shareholders can expect a clear alignment between effective financial management and positive returns on their investments, reinforcing their confidence in a company's long-term viability and performance.

These findings highlight the potential of cloud accounting systems to improve firms' financial metrics, which are crucial for attracting investors and maintaining shareholder confidence. As firms increasingly recognize the value of cloud accounting, those that effectively leverage these tools may find themselves better positioned in a competitive marketplace, which could lead to improved market valuation and enhanced shareholder wealth. Conversely, the negative impact of Cloud Accounting Software Intensity (CASI) on ROE points to the risks associated with high levels of expenditure on cloud accounting relative to total assets. This finding implies that, while investing in cloud solutions can yield benefits, excessive or poorly managed investments may lead to diminished returns. The significantly negative coefficient suggests that firms must be vigilant in monitoring their cloud accounting expenditures to prevent the erosion of financial performance. In conclusion, while cloud accounting usage has the potential to enhance shareholder wealth through increased returns on shareholders' funds, careful management of expenditures is crucial because excessive costs tied to cloud infrastructure could potentially hinder financial performance. The study recommends the following.

1. Pharmaceutical firms in Nigeria should enhance their investment in cloud accounting software by regularly training their finance teams on the effective use of these systems to maximize the benefits of cloud accounting to improve shareholder value.
2. Pharmaceutical firms should implement stricter cost management practices related to cloud accounting expenditures to prevent excessive spending that could negatively impact ROE.

5.1 Limitation/s and study forward

One of the primary limitations of this study is its restricted generalizability as the findings are based solely on the Nigerian pharmaceutical sector. The specific socioeconomic, cultural, regulatory, and operational contexts of Nigeria may not be directly applicable to other sectors or regions. Differences in market dynamics, regulatory frameworks, consumer behavior, and infrastructure could influence the extent to which the results of this study apply to other industries or countries. Therefore, while this study provides valuable insights into the Nigerian pharmaceutical sector, caution should be taken when extrapolating these results to other sectors or geographical locations. Future research could expand the scope of this study by comparing findings within the Nigerian pharmaceutical sector to other sectors within Nigeria (such as agriculture, manufacturing, or technology). This highlights whether the challenges and patterns identified in the pharmaceutical industry are sector-specific or common across industries.

References

Abidde, M. O. (2021). Cloud Computer Based Accounting and Corporate Financial Performance: A Study of Some Listed Manufacturing Companies in Nigeria. *IOSR Journal of Business and Management*, 12-19.

Al-Mutawa, B., & Al Mubarak, M. M. S. (2023). Impact of cloud computing as a digital technology on SMEs sustainability. *Competitiveness Review: An International Business Journal*, 34(1), 72-91.

Barney, J. B. (1996). The resource-based theory of the firm. *Organization science*, 7(5), 469-469.

Barney, J. B., Ketchen Jr, D. J., & Wright, M. (2021). Resource-based theory and the value creation framework. *Journal of management*, 47(7), 1936-1955.

Chen, X., Guo, M., & Shangguan, W. (2022). Estimating the impact of cloud computing on firm performance: An empirical investigation of listed firms. *Information & Management*, 59(3), 103603.

DeStefano, T., Kneller, R., & Timmis, J. (2023). Cloud computing and firm growth. *Review of Economics and Statistics*, 1-47.

Gangadhara, B. (2023). CLOUD ACCOUNTING COST AND FINANCIAL ACCOMPLISHMENT OF FIRMS IN INDIA. *International Journal of Multidisciplinary Engineering in Current Research*, 8(7).

Hamzah, A., Suhendar, D., & Arifin, A. Z. (2023). Factors Affecting Cloud Accounting Adoption In SMEs. *Jurnal Akuntansi*, 27(3), 442-464.

Ichsani, S., & Suhardi, A. R. (2015). The effect of return on equity (ROE) and return on investment (ROI) on trading volume. *Procedia-social and behavioral sciences*, 211, 896-902.

Lusy, L., Hermanto, Y. B., Panjaitan, T. W., & Widyastuti, M. (2018). Effects of current ratio and debt-to-equity ratio on return on asset and return on equity. *International Journal of Business and Management Invention (IJBMI)*, 7(12), 31-39.

Ma, R., Pan, X., & Suardi, S. (2024). Shareholder value maximization via corporate ESG performance: evidence from mergers and acquisitions in China. *Applied economics*, 56(58), 8529-8545.

Mistry, H. K., Mavani, C., Goswami, A., & Patel, R. (2024). The impact of cloud computing and ai on industry dynamics and competition. *Educational Administration: Theory and Practice*, 30(7), 797-804.

Monteiro, A., Cepêda, C., Da Silva, A. C. F., & Vale, J. (2023). The relationship between ai adoption intensity and internal control system and accounting information quality. *Systems*, 11(11), 536.

Mulyani, Y. (2023). Unraveling the Relationship between Business Strategy and Shareholder Value Maximization. *Advances in Applied Accounting Research*, 1(3), 170-183.

Nduokafor, C. O., Ukoh, U. M., & Nworie, G. O. (2024). Use of cloud-based accounting software: A tool for business failure prevention. *International Journal of Social Sciences and Management Research*, 10(2), 99-114.

Nezami, M., Tuli, K. R., & Dutta, S. (2022). Shareholder wealth implications of software firms' transition to cloud computing: a marketing perspective. *Journal of the Academy of Marketing science*, 50(3), 538-562.

Nworie, G. O., & Okafor, T. G. (2023). Nigeria Public Manufacturing Firms adoption of Computerised Accounting System: The Firm Size and Firm Capital Turnover Effect. *Journal of Global Accounting*, 9(1), 324-345.

Nworie, G. O., Okafor, T. G., & John-Akamelu, C. R. (2022). Firm-level traits and the adoption of computerised accounting information system among listed manufacturing firms in Nigeria. *Journal of Global Accounting*, 8(3), 128-148.

Onifade, H. O., Shittu, S. A., Aminu, A., & Ajibola, K. T. (2023). Effect of cloud accounting characteristics on performance of listed food and beverages companies in Nigeria. *Journal of Perspectives in Management–JPM*, 7, e257284.

Rawashdeh, A., Rawashdeh, B. S., & Shehadeh, E. (2023). The Determinants of Cloud Computing Vision and Its Impact on Cloud Accounting Adoption in SMBs. *Human Behavior and Emerging Technologies*, 2023(1), 8571227.

Ray, L. K. S., & Ghosh, M. M. K. (2023). Return on Equity or Wealth Maximization of Enterprise–Which is Preferable to Shareholders? *IBA JOURNAL OF MANAGEMENT & LEADERSHIP*, 16(1), 28.

Shuaibu, S., & Mohammed, A. M. (2023). The Effect of Earnings Management on Shareholders' Wealth Maximization from the Perspective of Money Deposit Banks in Nigeria. *Recent Trends in Data Mining and Business Forecasting*, 4(1), 43-49.

Udochukwu, C. N., Okorafor, J. O., & Nwankwo, C. T. (2024). Cloud Accounting Cost and Financial Performance: A Study of Nigerian Deposit Money Banks. *Journal of Interdisciplinary Research in Accounting and Finance (JIRAF)*, 11(1), 86-98.

Wisdom, O., & Grace, O. (2023). Cloud accounting cost and financial performance of manufacturing firms in Nigeria. *Russian Law Journal*, 11(3), 3060-3068.

Zhang, W. (2024). The application of cloud accounting in enterprise financial decision making in the era of big data. *Applied Mathematics and Nonlinear Sciences*, 9(1).