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CLOUD TECHNOLOGY ACCOUNTING AND FINANCIAL PERFORMANCE OF QUOTED OIL AND GAS COMPANIES IN RIVERS STATE.

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ABSTRACT

This study examined the influence of cloud technologies accounting on the financial performance of Oil and Gas companies in Rivers State. Cloud Technologies Accounting was considered from the perspective of three cloud ERP delivery models: private, public, and community Cloud Technologies Accounting. Financial performance on the other hand was measured in terms of net profit margin, return on assets, and return on equity. Top Management Support (TMS) was used as the contextual factor. The study adopts the descriptive survey research design. *Data were collected through primary and secondary sources and analyzed, using multiple linear regression techniques. Following the analysis, results showed that private, public, and community Cloud Technologies Accounting significantly associated positively with all three indicators of financial performances of oil and gas companies in Rivers State. Results only confirmed Top Management Support as a significant moderator in the relationship between community Cloud Technologies Accounting and the financial performance of oil and gas companies in Rivers State, thus confirming the findings of previous research that TMS is critical in increasing technology integration into business for better overall firm performance. We, therefore, conclude that Cloud Technologies Accounting allows businesses to improve their customer service while simultaneously lowering their operating expenses and expanding their profit margins. Consequently, we recommended that the government should workout and implement actionable programs aimed at reducing the cost of internet data and accessories to act as an incentive to many organizations in keying into the new technology. The government should also provide high-quality data centers to motivate companies to invest in Cloud Technologies Accounting, among other recommendations.*

INTRODUCTION

Cloud Technologies Accounting is the supply of accounting services over a computer network connected to the internet. This includes Internet-based software applications, data storage, and processing power on demand. According to Ping and Xuefeng (2011), Cloud Technologies Accounting is the use of cloud computing through the internet to create a virtual accounting information system. According to Mihalache (2011) (quoted in Bosoteanu, 2016): "Cloud Technologies Accounting is a modern concept in computer processing of accounting data based on cloud computing, which represents a set of distributed computing services, applications, access to information and data storage without the user needing to know the physical location and configuration of systems providing these services."

Over the previous 45 years of the country's existence, the Rivers State economy has been driven by the Oil and Gas industry. The industry was responsible for more than 85 percent of the country's foreign exchange revenues, 60 percent or more of its gross domestic product, but less than 15 percent of its employment rate (Etim, Confidence, & Umoffong, 2020). Since the passage of the Rivers State Oil and Gas Industry Content Development (NOGICD) Act in 2010, the marginal oil fields are controlled by Rivers State oil corporations. Multinational oil companies dominate the sector, particularly the upstream subsector. The sector in Rivers State has undergone a number of reforms to ensure that the operations of Oil and Gas businesses have a positive impact on economic growth and development (Adelegan, 2017). In response to the sector's untapped potential, the Rivers State government has enacted rules and regulations to attract greater investment, guarantee an increase in production capacity, and assure a sustainable

environment and sector (Etim et al, 2020). In this regard, it is believed that the deployment of cloud technology, particularly in the field of accounting, will present a unique opportunity for the industry to exploit.

Due to the importance of leadership throughout the duration of an IT project (Ahmed, Mohamad, & Ahmad, 2016), previous research has indicated a limited grasp of the impact of TMS on Cloud Technologies Accounting implementation (e.g., Ooi *et al.*, 2018 and Shee *et al..* 2018). This study intends to shed light on the usefulness of TMS in the installation phase of Cloud Technologies Accounting by simultaneously analysing its mediating and moderating effects in order to acquire a better understanding of the inconsistent relationship between Cloud Technologies Accounting implementation and financial performance. This study concurs with (Hayes, 2015; and Khosravi, Newton, & Rezvani, 2019) on the need to investigate mediating and moderating influences to properly comprehend the relationship between IT innovation and financial performance.

Statement of the Problem

Cloud Service Providers (CSPs) assert that moving to the cloud provides an abundance of significant operational benefits, such as scalability, accessibility, and availability of infrastructure and software (Youssef, 2012), particularly in light of the recent surge in demand for big data analytics, artificial intelligence, and machine learning. However, some accounting and financial professionals have conflicting opinions about cloud computing (Goasduff, 2015; Conner, 2016; Goldstein, 2020a, 2020b). The possible negative impact on key financial parameters, such as a decline in earning before interest, taxes, depreciation and amortization (EBITDA) and an increase in operating expenses, is a source of concern. The change in accounting treatment of the corresponding costs from capital expenditures under an on-premise system to operating expenditures under a cloud computing service may result in these negative implications. In addition, the subscription costs paid to cloud service providers may cause an increase in operating expenses. In light of the paucity of research on the topic in the Rivers State context, it would be premature to draw any conclusions regarding the anticipated impact of Cloud Technologies Accounting on financial performance. In light of this, an empirical investigation into the relationship between Cloud Technologies Accounting and the financial performance of Oil and Gas firms in Rivers State is required. Considering the importance of the Oil and Gas industry to the Rivers State economy, confirmation of the negative influence of Cloud Technologies Accounting would result in a severe economic hemorrhage necessitating the immediate formulation of a national regulatory framework designed to align the cloud services operation with business interests of critical sectors of the Rivers State economy.

Aims/Objectives of the Study

1. To ascertain the extent to which private Cloud Technologies Accounting influence net profit margin of oil and gas companies in Rivers State.
2. To investigate the extent to which public Cloud Technologies Accounting affects the net profit margin of oil and gas companies in Rivers State.
3. To ascertain the extent to which private Cloud Technologies Accounting influence return on equity of oil and gas companies in Rivers State.
4. To investigate the extent to which public Cloud Technologies Accounting affects the return on equity of oil and gas companies in Rivers State.

Research Hypotheses

H_{01}: Private Cloud Technologies Accounting significantly influences net profit margin of oil and gas companies in Rivers State.

H_{02}: Public Cloud Technologies Accounting significantly affects the net profit margin of oil and gas companies in Rivers State.

H_{03}: Private Cloud Technologies Accounting significantly influences return on equity of oil and gas companies in Rivers State.

H_{04}: Public Cloud Technologies Accounting significantly affects the return on equity of oil and gas companies in Rivers State.

LITERATURE REVIEW

Cloud Technologies Accounting

The concept of "Cloud Technologies Accounting" was first put forward by Ping and Xuefeng (2011). The term has been defined by them as the utilization of cloud computing in internet to build a virtual accounting information system, i.e., cloud computing plus accounting equals Cloud Technologies Accounting. Mihalache (2011) defines Cloud Technologies Accounting as "a modern concept in computer processing of accounting data based on the concept of cloud computing, which represents a set of distributed computing services, applications, access to information and data storage without the user having to know the physical location and configuration of systems providing these services" (cited in Bosoteanu, 2016). Broberg and Buyyasi (2008) on the other hand defined cloud computing as "an abstract collection of services, accessible from any location disposing of a mobile device with internet connectivity, provided through a parallel and distributed system of virtualised computers that are interconnected, and can be dynamically supplied and presented as a computing resource, or group of resources unified, according to the service-level agreement (SLA) approved by the service provider and the user". The term 'Cloud Technologies Accounting' and 'cloud computing' are frequently used interchangeably in literature. In fact, the concept of Cloud Technologies Accounting originated by taking the concept of 'cloud computing' and applying it in an accounting context. Cloud computing is seen as service delivery like software, shared information from the computer and other devices over a network. Cloud Technologies Accounting relates to the access to the accounting software and data through the internet. The user of Cloud Technologies Accounting could access the cloud-based application through their web browser or mobile applications while the software and information are stored and uploaded to the server remotely. The Cloud Technologies Accounting software can be accessed through the internet with the help of the browser, (Gordillo & Mclaren-Doerr, 2021). The software needs to be subscribed on annual basis and the information is often stored on the remote server. Thus, Cloud Technologies Accounting is the practice of using an accounting system that is accessed through the internet.

Private Cloud Technologies Accounting

Private Cloud Technologies Accounting is also known as Internal Cloud Technologies Accounting or Corporate Cloud Technologies Accounting. It is the cloud infrastructure that is managed and operated for one organization only. It is a cloud computing environment in which all hardware and software resources are accessible and dedicated to a single client. According to Salam *et al.* (2015), private cloud deployment model is primarily the provisioning of private and unshared IT infrastructure and resources. This enables a consistent level of control over security and privacy. Further, there are certain legal, political, socio-organizational reasons that may discourage or even bar an organization from using public cloud infrastructure for certain kinds of activities, for example processing and storing citizens' private data. For these kinds of situations, private cloud infrastructure is considered an appropriate alternative. Hence, private cloud infrastructure is gaining much more popularity than the public cloud solutions in certain parts of the World, (e.g., Europe). Through this, it becomes very possible to regulate and manage the sub-structure so that governance can be maintained according to the objective of the organization. Deployment environment is owned by private sectors solely for the secure storage of company's data (Goyal 2014). It might be managed by the organization or a third party and may exist on premise or off premise depending on the choice of the client.

Public Cloud Technologies Accounting

Public cloud services may be free or offered through a variety of subscription or on-demand pricing schemes, including a pay-per-usage model. Public Cloud provides a shared platform that is accessible to the general public through an internet connection. According to Lewis (2010) it is a distributed computing paradigm that focuses on providing a wide range of users with distributed access to scalable, virtualized hardware and software infrastructure over the internet. In line with the notion of shared services Su *et al*., (2009) held that it is considered as an innovative model for IT service sourcing that generates value for the adopting enterprises. The public Cloud Technologies Accounting is also defined as computing services offered by third-party providers over the public Internet, making them available to anyone who wants to use or purchase them. They may be free or sold on-demand, allowing customers to pay only per usage for the CPU cycles, storage or bandwidth they consume. Li, Liang, O'Brien & Zhang (2013) defined it as:

Factors Affecting Adoption of Cloud Technologies Accounting

Notably, the rising adoption of cloud-based ERPs by businesses in Rivers State is being driven by the want for flexible working arrangements that maximise productivity as well as the imperative for dependable backup systems that are immediately available online. The majority of business owners are coming to the realisation that old backup methods like as tapes should be phased out because of the increased risk of errors, theft, and fraud that they present. However, a significant number of businesses are unable to effectively use Cloud Technologies Accounting software and make use of it to cut down on their operational expenses. As a result of these various circumstances, businesses such as CISCO have joined the market to assist businesses in the provision of cloud-based accounting services. The company catered to business clients and provided a variety of Cloud Technologies Accounting services, such as hosting, backup services, and storage space.

However, in spite of the numerous obstacles, Cloud Technologies Accounting platforms offer an uptime of 99.9 percent, which indicates that they almost never stop working. Because of this, the only thing that a company will need to spend money on is a reliable internet connection. In addition to this, it has been found that Cloud Technologies Accounting is more environmentally friendly. According to observations made by Winston (2011), businesses that switch to using Cloud Technologies Accounting have the potential to cut their overall energy use and carbon footprint by as much as ninety percent. The global community as a whole is becoming more environmentally conscientious, and as a result, the reduction of carbon emissions has become a primary focus for many organisations around the world in the present day. If there are fewer servers operating, there will be a lower demand for electricity and a smaller amount of heat will be released into the atmosphere, both of which are beneficial to everyone.

Cloud Technologies Accounting in Rivers State

According to Nnadozie (2013), in a similar manner, the Rivers State Airspace Management Agency (NAMA) has reportedly implemented Windows Server 2012, which makes it possible to perform several jobs while simultaneously reducing costs. One example of this would be the partnership of CISCO, NetApp, and Microsoft, which aims to deliver reliable cloud services to all of those companies' customers and subscribers. The Central Bank of Rivers State (CBN), in addition to the top eight (8) banks in Rivers State, uses NetApp as their primary storage solution. The implementation of the Rivers State Uniform Bank Account Number (NUBAN), which was made possible by cloud computing, is a significant step forward for the banking industry in Rivers State. According to Iwuchukwu (2017), the expenses of providing infrastructure and software are no longer solely carried by the individual banks. Instead, these costs are shared among the many banks in order to lower the operational costs and, as a result, increase the profitability of the individual banks. According to Wyse, a cloud provider makes its services available to Electronic Test Companies (ETC) in Rivers State in order to facilitate the administration of examinations

there. As a result of this innovation, examinations will be both quick and trustworthy, free from the inherent possibility of cheating that is characteristic of the paper-based tests of the past (Wyse, 2011). According to Udofia (2015), another significant event in the development of cloud technology was the MDX alliance. It was a partnership that was built on the enterprise-grade infrastructure that Microsoft Azure provides.

Financial Performance

According to CFI (2021), financial performance is a complete evaluation of a company's overall standing in categories such as assets, liabilities, equity, expenses, revenue and overall profitability. It is measured through various business-related formulas that allow users to calculate exact details regarding a company's potential effectiveness. For internal users, financial performance is examined to determine their respective companies' well-being and standing, among other benchmarks. A firm's financial performance is of importance to investors, stakeholders and the economy at large. Investors are interested in the returns for their investment. A business that is performing well can bring better reward to their investors. Financial performance of a firm can increase the income of its staff, rendering quality product or services to its customers and creating more goodwill in the environment it operates. A company that has good performance can generate more returns which can lead to future opportunities that can in turn create employment and increase the wealth of people. Firm's performance is the ability of a firm to achieve its objectives from its available resources. A firm's performance can be viewed as the result of a company's assessment or strategy on how well a company accomplished its goals and objectives. Financial performance provides a deductive measure of how well a company can use assets from business operations to generate revenue. Pandey (2005) seems to concur with this notion when he defined financial performance as a subjective measure of how well a firm can use assets from its primary mode of business and generate revenues.

Net Profit Margin

Net profit margin is a profitability ratio that measures what percentage of revenue and other income is left after subtracting all costs for the business, including costs of goods sold, operating expenses, interest, and taxes. Net profit margin differs from gross profit margin as a measure of profitability for the business in general, taking into account not only the cost of goods sold, but all other related expenses Stobierski (2023). Profit margins can vary by industry. Growth companies (any company whose business generates significant positive cash flows or earnings, which increase at significantly faster rates than the overall economy) might have a higher profit margin than retail companies (companies that specialize in the sale of goods or services to consumers), but retailers make up for their lower profit margins with higher sales volumes. It is possible for a company to have negative net profit margin. A negative net profit margin occurs when a company has a loss for the quarter or year. That loss, however, may just be a temporary issue for the company.

Return on equity (**ROE**)

According to Henricks (2020) ROE is defined as the business' net income relative to the value of its shareholders' equity. Return on equity (ROE) measures how well a company generates profits for its owners. It reveals the company's efficiency at turning shareholder investments into profits. Return on equity (ROE) is a measure of financial performance calculated by dividing net income by shareholders 'equity because shareholders 'equity is equal to a company's assets minus its debt, ROE could be thought of as the return on net assets. In corporate finance, the return on equity (ROE) is a measure of the profitability of a business in relation to the equity, also known as *net assets* or *assets minus* liabilities. ROE is a measure of how well a company uses investments to generate earnings growth. Return on equity (ROE) is a ratio that provides investors with insight into how efficiently a company (or more specifically, its management team) is handling the

resources that shareholders have contributed to it. In other words, it measures the profitability of a corporation in relation to stockholders' equity.

Top Management Support

According to Ifinedo (2008), the extent to which the top management of a business provides direction, expertise, and resources during and following the installation of Cloud Technologies Accounting systems is referred to as "top management support." Commitment from top management is critical to ensure that an organization's objective is realized to the point of increasing company performance. Top management support is a critical factor in overcoming barriers and boosting an organization's technological capacity to efficiently utilize new technological services or products (Hsu, Liu, Tsou, & Chen, 2019). Cloud Technologies Accounting is one of the new technologies that businesses have recently embraced, and TMS is vital to its successful implementation. Cloud Technologies Accounting is intended to resolve communication issues between functional area information systems (IS), to unify all of an organization's units and departments, and to automate all of the organization's procedures and operations (Meghana, Mathew, & Rodrigues, 2018; and Rainer, & Cegielski, 2018). Cloud Technologies Accounting systems are more cost-effective, take up less time, consume less energy, and operate through the internet. Payment for Cloud Technologies Accounting software services is made via subscriptions that must be remunerated on a monthly basis, for example, for each user (Seethamraju, 2014). Therefore, it is the best alternative for oil and gas companies who have limited resources. As a result, an increasing number of oil companies should be implementing Cloud Technologies Accounting to increase their competitiveness, efficiency, and customer base. The literature on Cloud Technologies Accounting has identified top management support as a significant success factor. For example, some studies have examined and confirmed the importance of TMS in deploying Cloud Technologies Accounting (Alsadi, 2018; Usman, Ahmad, & Zakaria, 2019; AL-Shboul, 2018; Kinuthia, 2015; and Qian, Baharudin, & Kanaan-Jebna, 2016). However, these studies were focused only on the adoption/implementation stage. On the other hand, other studies have devoted attention to the value and benefits of Cloud Technologies Accounting in the post-implementation stage.

Theoretical Foundation

The theory that props this study is the Technology-Organization-Environment (TOE) theory developed in 1990 by Tornatzky and Fleischer. It argued for the organization's embracing and application of technological modernizations.

The Technology-Organization-Environment Framework

Technological context describes factors describing adoption an existing technology as well as new technologies relevant to the firm. Organizational context refers to the effect of organizational variables such as scope, organizational size, and the number of slack resources available. Environmental context describes the effect of external variables on technology adoption which is related to industry, competitors and government. It has been used by several authors in order to comprehend different IT adoptions like open Information Systems; electronic data interchange; e-business; e-business usage; ERP; knowledge management Information Systems; Cloud Technologies Accounting (Alshamaila, Papagiannidis & Li, 2013; Chau & Tarn, 1997; Kuan & Chau, 2001; Boumediene, Peter & Oswaldo, 2009; Raymond & Uwizeyemungu, 2007; Wang, Wang & Yang, 2010; Zhu & Kraemer, 2005; Zhu, Kraemer & Xu, 2003). As Cloud Technologies Accounting has been viewed as a new paradigm shift to manage IT services, it has been argued that if TOE is integrated with any other theoretical model, it can offer meaningful insights related to Cloud Technologies Accounting implementation and related processes. It is found important to determine how Cloud Technologies Accounting affects growth, competitiveness or performance of organizations and created business value (Raymond & Uwizeyemungu, 2007).

Empirical Review

Taiwo (2016) evaluated the 'Effect of ICT on accounting information system and organizational performance: The application of ICT on accounting information system'. The sample comprised 20 staff from the financial and accounting departments at Covenant University. The study relied on secondary data. The data were analysed using Pearson's correlation technique. The results showed a significant positive relationship between ICT and accounting system; and, a significant positive relationship between ICT and organizational performance.

Ali, Bakar, and Omar (2016) conducted a study titled 'The critical success factors of accounting information system (AIS) and its impact on organizational performance of Jordanian commercial banks'. They surveyed 273 respondents in the Jordanian banking sector. The study relied on primary data collected via a structured questionnaire. The data were analysed using with PLS-SEM technique. The results revealed that service quality, information quality and system quality are significant AIS success factors for increasing organizational performance.

Kyeremeh, Prempeh, and Afful Forson (2019) conducted a study titled 'Effect of information communication and technology (ICT) on the performance of financial institutions (A case study of Barclays Bank, Sunyani Branch)'. The study adopted both exploratory and descriptive research designs. The study relied on primary data which was collected using structured questionnaires. The sample comprised 50 respondents (i.e., 8 staff members and 48 customers) of Barclays Bank drawn using purposive and systematic sampling techniques. The data were analysed using descriptive statistics. The results revealed that ICT has a positive effect on performance from improved customer service delivery.

Amahalu, Abiahu & Chidoziem (2017) Comparative Analysis of Computerized Accounting System and Manual Accounting System of Quoted Microfinance Banks (MFBs) in Rivers State. The study employed descriptive Statistics methodology. The statistical tools used was mean for the measures of central tendency. Parametric inferential statistical methods were applied: T-test Predictive statistical correlation and regression methods. The study discovered that Computerized accounting system has an effect on net income and equity of banks more than manual accounting system. Computerized accounting system has a more positive effect on the level of confidence of global investors and investment analysts in the financial statements of companies in Rivers State than the manual system of accounting.

Chinyao, Yahsueh & Mingchang (2011) studied the adoption of Cloud Technologies Accounting and financial performance of high-tech industry in Taiwan. The study used descriptive statistical methodology. The study obtained data through questionnaire from 111 firms in Taiwan. Relevant hypotheses were derived and tested by logistic statistical regression analysis. The study found that relative advantage, top management support, firm size, competitive pressure, and trading partner pressure characteristics has a significant effect on the adoption of cloud computing.

Okoye (2021) researched the impact of Cloud Technologies Accounting on Performance of Rivers State Banking Industry. A Study of Some Selected Banks in Rivers State Banking Industry.

METHODOLOGY

Research Design

The study adopts the descriptive survey research design. This research design allows researchers to gather information, summarize, present, and interpret it for clarification (Peter, Kamau, & Ombui, 2018). The choice of survey research design is based on the fact that surveys enable a researcher to obtain data about practices, situations or views at one point in time through questionnaires or interviews.

Population of the Study

Avwokeni (2006) refer to population of study as the "set of all participants that qualify for a study". Akinade and Owalabi (2009) defined population as "the total set of observations from which a sample is drawn". Popoola (2011) defined population as "the totality of the items or objects under the universe of study. It often connotes all the members of the target of the study as defined by the aims and objective of the study". From the foregoing, the term population is conceptualized to mean the whole items, objects, materials or people that fall within a geographic location in which a researcher intends to investigate for his study. The populations considered for this study are oil and gas companies operating in the upstream subsector of the Rivers State economy.

Sampling Procedure/Sampling Size

A purposive or judgmental sampling procedure which is a non-probability sampling technique was adopted for the study. Consistently, firms that do not constitute the scope of oil and gas companies were not included in the sampling size. Judgemental sampling technique was used according to a list of oil and gas companies in Rivers State obtained online (see appendix 1), there are a total of 07 foreign and 3 local oil and gas companies (upstream) in Rivers State, thus constituting an overall total of 02 in number. Since the population size is small and finite, the entire population will be studied, using a purposive sampling method.

Agip Energy & Natural Resources (Rivers State)
Brass Exploration
Chevron Rivers State
Conoco Energy Rivers State
Conoco Petroleum Rivers State
Elf Petroleum Rivers State (Epnl)
Esso Exploration & Production (Rivers State) (Eepnl)
Hardy Oil Rivers State
Mobil Producing Rivers State

Method of Data Collection

The primary sources include interviews, observations and administration of questionnaires (Kothari, 2017). In this study we adopted the questionnaire as the instrument for primary data source. The secondary data constitutes documentary, these includes journal articles, newspapers, magazines, records of institutions, unpublished works, official reports and statistics. According to Kothari (2017), secondary sources include previous research, review of literatures, proceedings and textbooks. This study adopted both primary and secondary method of data collection.

Instrument Design

Instrument design is crucial to data collection. Nevertheless, professionals rated questionnaires and surveys among the bottom of methods that constitutes one of the best survey instrument designs (Gulliken et al., 2004; Bark et al., 2005; Mao et al. 2005). The instrument design adopted for the study is questionnaire instrument with demographic distributions namely; functional position distribution, length of service distribution, educational qualification distribution and age distribution. Other instrument designs constitute the constructs for "Intensity of Private, Public Cloud Technologies Accounting", "constructs for Financial Performance" and constructs for "Top Management Support".

Validity of Research Instrument

This opinion was maintained by (Cooper & Schindler 2008). They theorised that validity is the ability of the research instrument to measure what it is supposed to measure. There exist two main types of validity. They are construct validity and content validity. Construct validity is the evaluation of the extent to which a measure assesses the construct it is deemed to measure.

Content validity measures the extent to which the instrument adequate coverage of the investigative questions guiding the study.

Reliability of Research Instruments

It is the degree to which measures are free from random error and consequently yield consistent result. In this study, the reliability of the measures to be used will be evaluated using the Cronbach's alpha coefficient. Cronbach's alpha has the most utility for multi-item scale at the interval level of measurement Cooper & Schindler 2008).

Method of Data Analysis

This clearly implies a cause-and-effect relationship between Cloud Technologies Accounting practices (the independent variable) and financial performance (the dependent variable) which requires a quantitative approach and positivist leaning. Consistent with the positivist research philosophy and quantitative design, the employed technique of inferential analysis in this study is parametric statistics. This technique is associated with the use of quantitative models that seek to establish correlational relationship between two variables by using sample-based parameters as measures to infer about the population of the study. The data analysis was executed in three distinct stages. Firstly, a univariate (or descriptive) analysis was executed, followed by bivariate analysis and lastly, multivariate analysis. Since a cross-section of oil companies is what can fill the void of data insufficiency, regression is undoubtedly a more appropriate technique to test the cause-effect relation between two or more variables than other statistical methods like non-parametric tests. Statistical software (Excel Analytical software and Eview) was employed to facilitate the computation of critical test criteria.

Model Specification

This section specifies an econometric model aimed at capturing the relationship between Cloud Technologies Accounting and the performance of oil and gas companies in Rivers State. The model for this study will be anchored on the Tornatzky and Fleisher's (1990) Technology-Organisation-Environment and Barney's (1991) theories. Therefore, deducing from the above, the functional relation of the variables is presented as:

$$PERF = f(PVCA, PBCA,) \quad (3.1)$$

Where *PERF* is financial performance, *PVCA* is private Cloud Technologies Accounting, *PBCA* is public Cloud Technologies Accounting. Since PERF is measured in terms of net profit margin (NPM), and returns on equity (ROE) respectively, equation 3.1 will be decomposed into three sub-equations as follows:

$$NPM_i = a_o + a_1PVCA_i + a_2PBCA_i + U \quad (3.2)$$

$$ROE_i = c_o + c_1PVCA_i + c_2PBCA_i + \lambda \quad (3.3)$$

Where u, E and λ are error terms; a_0, b_0 and c_0 are parameters representing the intercepts of the respective regression equations; a_1, b_1 and c_1 are respectively NPM, and ROE response coefficients of private Cloud Technologies Accounting; a_2, b_2 and c_2 are respectively NPM, and ROE response coefficients of public Cloud Technologies Accounting; and a_3, b_3 and c_3 are respectively NPM, and ROE response coefficients of community Cloud Technologies Accounting. In line with the theoretical underpinnings of the study, our *a priori* expectation with respect to the response coefficients are:

With respect to NPM:

$a_1 > 0$; $b_1 > 0$ and $c_1 > 0$

Concerning ROE:

$a_3 > 0$; $b_3 > 0$ and

DATA PRESENTATION AND ANALYSIS

Field Report

The data presentation begins with a report on field experience as it relates to the quality of the study. A total of 54 copies of questionnaires were distributed to the accounting staff of oil and gas companies through an online-based research survey agency as a proxy. From the responses obtained, 20 (or 37.0%) of the distributed copies were issued to firms using private cloud ERP, 18 (or 33.3%) were issued to firms using public cloud ERP while 16 (or 29.7%) were issued to firms using community cloud ERP.

Table 4.1: Questionnaires Administered and Retrieved

Category of Cloud ERP Users	Quest. Issued	Retrieved	Response Rate (%)	Not Retrieved	Discarded	Retained for analyses
Private	20	20	100.0	0	5	15
Public	18	17	94.4	1	2	15
Total	**38**	**37**	**96.3**	**1**	**7**	**30**

Source: Field Report, 2024.

Out of the 38 copies issued, 37 representing 96.3% were retrieved and two were not retrieved. Further to achieving cross-sectional balance across cloud type, 7 of the retrieved copies were discarded. The discarded copies were judgmentally selected based on the quality of response obtained, using educational qualification and designation status of the respondents as yardsticks. This is a confirmation of the growing adoption of Cloud Technologies Accounting technologies by oil and gas companies in order to adapt to their evolving operational requirements. This demography is captured in the pie chart presented as figure 4.1.

The respondents whose opinions we eventually used mostly fall within youthful age brackets. The implication of this demography is that, a reasonable degree of reliance can be placed on their judgment concerning ICT. More than 80% of the respondents are not older than 45 years.

Table 4.2: Respondents' Age Distribution

Age Bracket	Frequency	%
20 - 25 yrs	2	4.4
26 - 35 yrs	7	15.6
36 - 45 yrs	30	66.7
Greater than 45	6	13.3
	45	**100.0**

Source: Field Report, 2024.

More so, a good proportion of the respondents are on senior manager cadre, meaning that their opinions on the subject of inquiry are reliable. This position is valid based on the premise that staffs at higher strategic apex have greater access to company information than those at lower level. Table-4.3 presents distribution of respondents' designations, indicating their ranks/statuses and accessibility to prime company information.

Table 4.3: Respondents' Designations Distribution

Rank/Status	Frequency	%
Director	8	17.8
Snr Mgr	28	62.2

Mid-Mgr	4	8.9
Jnr Mgr	5	11.1
	45	**100.0**

Source: Field Report, 2024.

Furthermore, going by the logic of working experience and knowledge as a function of time, the survey respondents are highly experienced about the companies which they sampled opinions as indicated in table 4.3. Majority of the respondents have been in their company's employment for more than 10 years. This means their opinions should be reliable and be considered well informed source.

Table 4.4: Respondents' Length of Service Distribution

Time Ranges	Frequency	%
Less than 5yrs	4	8.9
btw 5 - 10yrs	17	37.8
btw 10 - 15yrs	24	53.3
Above 15yrs	0	0.0
	45	**100.0**

Source: Field Report, 2024.

As a further complement to the credibility of their collective opinion on the subject at hand, each of the respondents has adequate educational qualification related to the subject of study. In fact, the adequacy of their educational qualification is skewed in the direction of higher degree of learning as lucidly demonstrated in table 4.5:

Table 4.5: Respondents' Educational Qualification Distribution

Educational Qualification	Frequency	%
OND	1	2.2
HND	2	4.4
BSc	8	17.8
MBA/MSc	24	53.3
PhD	10	22.2
	45	**100.0**

Source: Field Report, 2024.

Overall, all determinants of good credibility score of testimonies and opinions from respondents in a survey, namely: information accessibility on the subject of opinion, maturity, experience, and knowledge quotients show high scores, thus attesting to the reliability and credibility of sampled opinions. Moreover, extensive interview sessions that the researcher had with key cloud service providers and clients serve as added value in enriching the industry knowledge-base of the research.

Data Presentation

Univariate Analysis

In this section, descriptive analysis of the respective variables is presented to emphasize the reliability and validity of estimates obtained.

Cloud Technologies Accounting

Cloud Technologies Accounting was represented by three forms of delivering cloud services to clients, namely: private cloud, public cloud and community Cloud Technologies Accounting. Since these variants of Cloud Technologies Accounting are mutually exclusive operationally (i.e. a cloud client chooses one form at a time, and not any combination of them), each of the variants was measured with the same instrument consisting of 12 items by equal number of members from different subsets of the study population. Question 10, section B of the research instrument contains the items as follows:

1. Usage Intensity of cloud ERP in the firm's accounting functions
2. Frequency of cloud ERP in supporting functions of the firm
3. Indispensability of cloud ERP to the firm's strategic functions
4. Cloud ERP alignment with the firm's customers service capability
5. Cloud ERP alignment with the firm's business strategies
6. Cloud ERP alignment with the firm's process management improvement capability
7. Cloud ERP alignment with the firm's product/service offering capability
8. Cloud ERP alignment with the firm's capability in devising strategic plan
9. Cloud ERP alignment with the firm's business goals consolidation capability
10. Cloud ERP alignment with the firm's business objectives
11. Cloud ERP alignment with opportunity recognition ability
12. Cloud ERP alignment with the firm's adaptation ability to strategic changes

Respondents were asked to indicate their opinion against each of the statements using five-point Likert-scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Results from each of the three different subsets (i.e. users of private, public and community cloud) are presented in table-4.6.

On the average, respondents' collective opinion points at 4.3 on the 5-point Likert scale. This indicates an affirmation of high prevalence of private cloud usage intensity. As suggested by the result from table 4.6 (item 6), the highest prevalence of private cloud usage intensity is mostly attributed to the alignment of cloud ERP with the firms' process management improvement capability. Item-6 is the highest while item 7 is the least prevalent factor in private cloud ERP alignment with the firm's product/service offering capability.

The overall standard deviation suggests moderate variability of cloud ERP usage intensity among the respondents, a factor which can be attributed to divergence in organisational and operational structures.

Table-4.6: Intensity of Private Cloud Technologies Accounting Prevalence

Items	Mean Score	Std Dev	Verdict
Usage Intensity of private cloud ERP in the firm's accounting functions	4.3	1.2	Agree
Frequency of private cloud ERP in supporting functions of the firm	4.2	0.7	Agree
Indispensability of private cloud ERP to the firm's strategic functions	4.3	0.7	Agree
Private cloud ERP alignment with the firm's capability in customer services	4.1	0.8	Agree
Private cloud ERP alignment with the firm's business strategies	4.6	0.6	Strongly Agree
Private cloud ERP alignment with the firm's process management improvement capability	4.7	0.8	Strongly Agree

Private cloud ERP alignment with the firm's product/service offering capability	3.9	1.0	Agree
Private cloud ERP alignment with the firm's capability in devising strategic plan	4.3	0.8	Agree
Private cloud ERP alignment with the firm's business goals consolidation capability	4.3	0.6	Agree
Private cloud ERP alignment with the firm's business objectives	4.6	0.6	Strongly Agree
Private cloud ERP alignment with opportunity recognition ability of the firm	4.3	0.7	Agree
Private cloud ERP alignment with the firm's adaptation ability to strategic changes	4.3	0.9	Agree
Aggregate	**4.3**	**0.8**	**Agree**

Source: Field Report, 2024.

On a five-point Likert scale, the average aggregate opinion of respondents is 4.3. This shows a confirmation of high prevalence of private Cloud Technologies Accounting usage.

The extent to which all sub-constructs (otherwise known as items) used in measuring a variable co-vary in the same direction is known as uni-dimensionality (Kothari, 2004). In order to ascertain the uni-dimensionality of the twelve items of private cloud ERP usage intensity, a confirmatory factor analysis was carried out. The orthonormal loading bi-plot which is shown in figure 4.2 shows that only one of the first two derived components explains 98.6 per cent of the total variance, with an Eigen value of 11.832.

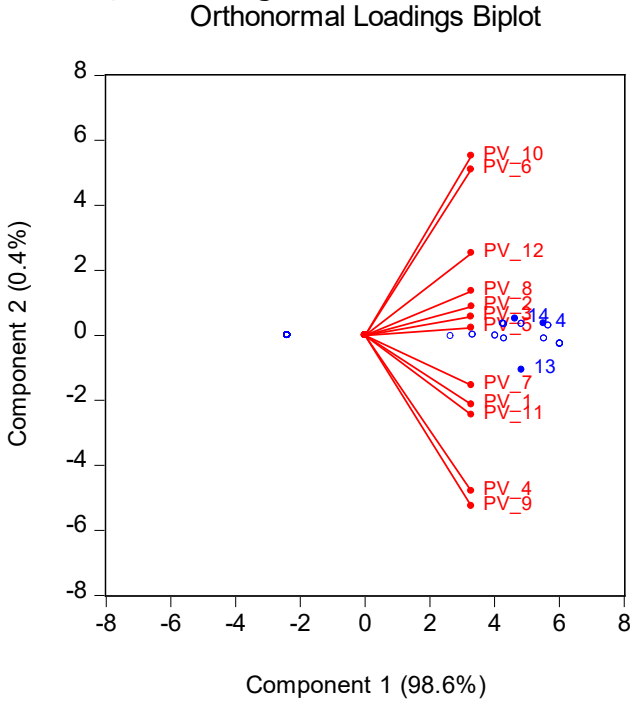

Figure 4.2: Orthonormal Loading Biplot (Private Cloud Technologies Accounting)

Source: EViews output Version 10

The Cronbach's alpha of 0.891 for all the twelve items indicates an acceptable level of internal reliability. Since the foregoing statistics indicate high degree of reliability and validity of

measurement, the estimated principal component can suitably serve as private Cloud Technologies Accounting proxy.

Table-4.7: Intensity of Public Cloud Technologies Accounting Prevalence

Items	Mean Score	Std Dev	Verdict
Usage Intensity of public cloud ERP in the firm's accounting functions	3.8	1.3	Agree
Frequency of public cloud ERP in supporting functions of the firm	3.7	1.2	Agree
The indispensability of public cloud ERP to the firm's strategic functions	3.9	1.1	Agree
Public cloud ERP alignment with the firm's capability in customer services	3.9	0.8	Agree
Public cloud ERP alignment with the firm's business strategies	3.7	0.9	Agree
Public cloud ERP alignment with the firm's process management improvement capability	3.3	1.3	Undecided
Public cloud ERP alignment with the firm's product/service offering capability	3.7	0.9	Agree
Public cloud ERP alignment with the firm's capability in devising strategic plan	3.4	1.4	Undecided
Public cloud ERP alignment with the firm's business goals consolidation capability	3.5	1.5	Agree
Public cloud ERP alignment with the firm's business objectives	3.5	1.2	Agree
Public cloud ERP alignment with opportunity recognition ability of the firm	3.4	1.5	Undecided
Public cloud ERP alignment with the firm's adaptation ability to strategic changes	3.6	1.5	Agree
Aggregate	**3.6**	**1.3**	**Agree**

Source: Field Report, 2024.

Similarly on a five-point Likert scale, the average aggregate opinion of responders is 3.6. This shows a confirmation of moderate prevalence of public cloud usage. The aggregate standard deviation indicates higher degree of variation than the one recorded in private cloud ERP adoption intensity among respondents. Again, this can be related to organisational and operational structural differences.

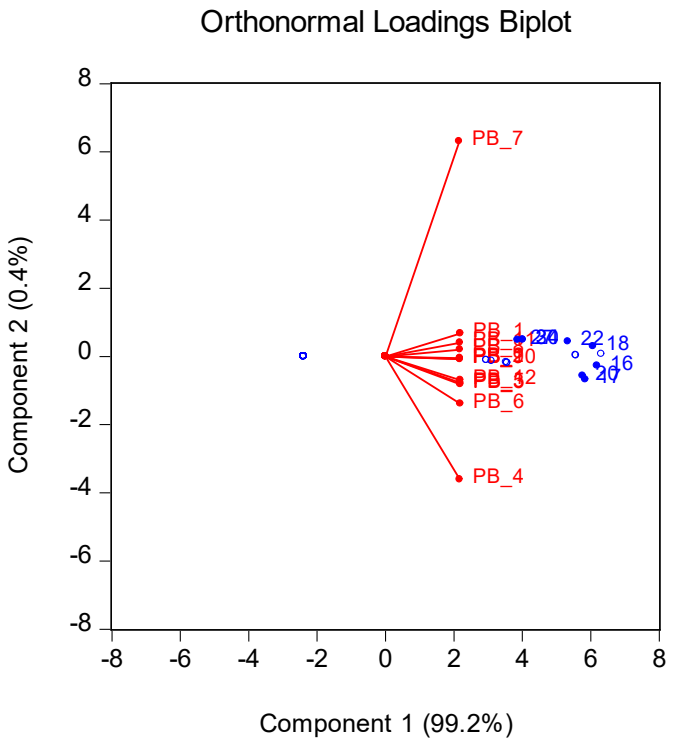

Figure 4.3: Orthonormal Loading Biplot (Public Cloud Technologies Accounting)
Source: EViews output Version 10

As before, principal component analysis was conducted to determine the extent to which all twelve items of public cloud ERP usage intensity go in the same direction in measurement. Figure 4.3 orthonormal loading bi-plot reveals that only one of the first two derived components, with an Eigen value of 11.904, explains 99.2% of the total variation. The Cronbach's alpha value of 0.863 for all twelve items suggests an adequate level of internal consistency. Since the preceding statistics demonstrate a high degree of measurement reliability and validity, the estimated principal component can serve as a suitable representation of public Cloud Technologies Accounting.

Financial Performance
Due to certain practical limitations inherent in measuring this variable, both primary and secondary data were utilised in complementary manner. Financial performance as a variable is unquestionably better quantified using secondary data. However because of data accessibility limitations, only a fraction of the required data volume was obtained. To avoid compromising the validity of the study's results due to insufficient sample size, the researcher elected to use primary data, which has greater sample coverage than secondary data. This is why secondary data played a supporting role in the analysis, rather than being the bedrock of the analytical framework.
Financial performance is measured in terms of net profit margin, return on assets and return on equity. Accordingly, the procedures for primary data measurement follow in that order.

Net Profit Margin
Net profit was measured with five items, using manifest constructs including '*turnover rate improvement*', '*relative rate of change between sales and operating expenses*', '*relative rate of change between sales and production cost*', '*reduction in cost-driving activities*' and '*widening persistence of margin*'. Overall average responses on these manifest constructs are presented in table-4.9.

Table-4.9: Net Profit Margin

Items	Mean Score	Std Dev	Verdict
Consecutive two years improvements in turnover rate	3.5	1.3	Undecided
Faster rate of increase in selling price than recorded rate of increase in operating expenses	3.6	1.4	Agree
Consecutive two years reduction in unit production cost relative to unit sales	3.4	1.4	Undecided
Consecutive two years reduction in cost-driving activities	4.7	0.6	Strongly Agree
Consecutive two years widening in profit margin	4.4	0.6	Agree
Aggregate	**3.9**	**1.3**	**Agree**

Source: Field Report, 2024.

On a 5-point Likert scale, the average response from responders is 3.9. This shows confirmation of a moderate incidence of net profit margin. The least net profit determinant construct as shown in table-4.9 is turnover rate improvement, while the most is reduction in cost-driving activities. The result also indicates preponderance of profit margin variability among the sampled firms as implied by the standard deviation, relative to the mean score (i.e. coefficient of variation). By implication, the coefficient of variation is 33.33%, indicating that the collective opinion scale could deviate up to a third point away from the actual scale.

The foregoing descriptive attributes of the collective opinion on net profit margin share close similarity with those presented in figure 4.5 which are results from the secondary source.

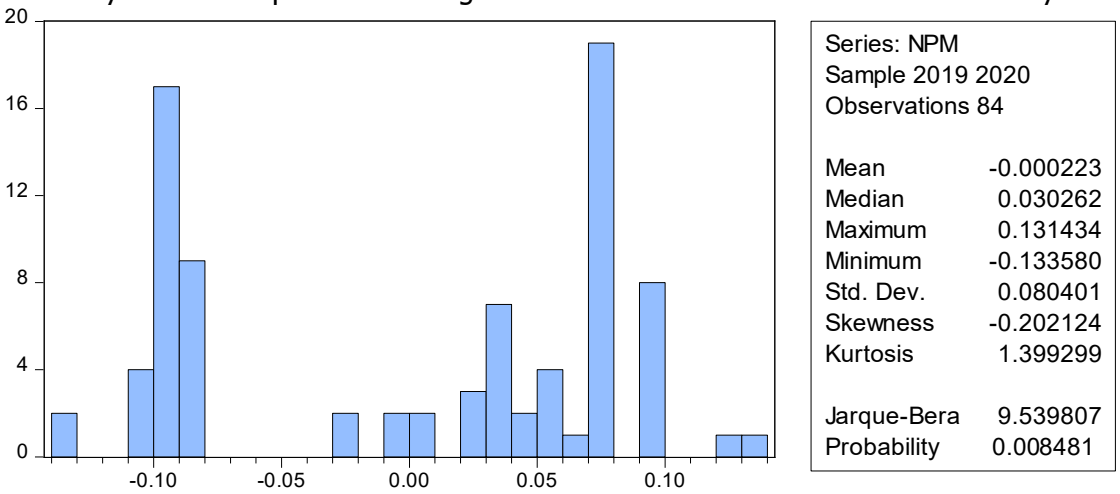

Figure 4.5: Net Profit Margins of Oil and gas companies using Cloud ERPs

Source: EViews output Version 10

Figure 4.5 constitutes two-year (2019 and 2020) annual data from 42 companies, most of which are members of the sampled respondents. The mean and median scores are -0.02% and 3.02% respectively. This score aligns with the near neutrality score (3.9 on a 5-point Likert scale) obtained in the primary data score. Also, the coefficients of variation from both primary and secondary sources approximately share the same attributes, indicating high degree of variability. The skewness (-0.2021) of the secondary data indicates that majority of the data points are in the positive region than they are in the negative region, despite the negative mean score. Again, this

is similar to the 3.9 score obtained from the primary data which tilts towards 4-point scale than 3-point scale.

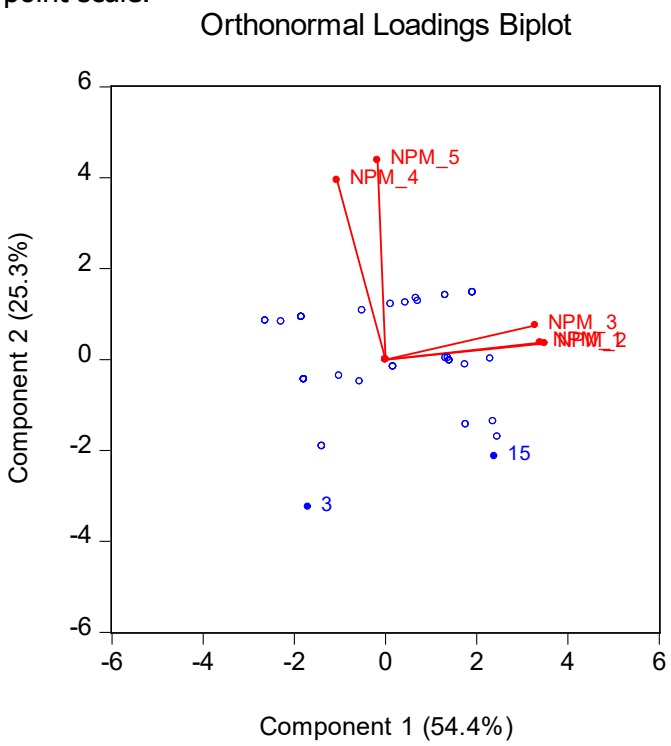

Figure 4.6: Orthonormal Loading Bi-plot of Net Profit Margin
Source: EViews output Version 10

As a way to further confirm the validity of the primary data measurement paradigm, principal component analysis was executed to determine the uni-dimensionality of the five manifest constructs used in the measurement. Figure 4.6 presents the orthonormal loading bi-plot of the principal component. It reveals that only one of the first two derived components has an Eigen value of 2.72, accounting for 54.4 percent of the total variation. A satisfactory level of internal consistency was recorded as measured by the Cronbach alpha values of 0.828. It is therefore evident that both primary and secondary data mostly share common reliability and validity attributes of estimated net profit margin.

Return on Equity

Similarly, four (4) manifest constructs were used to measure Return on Equity (ROE), and responses were calibrated using a 5-point Likert scale. Accordingly based on a scale of 1 to 5 representing "Strongly Disagree" to "Strongly Agree", respondents were asked to indicate how much of the constructs were present in their respective businesses using the following instruments:

1. "In the last two successive years, the growth rate of your firm's equity capital has maintained steady increases due entirely to profit retentions"
2. "The equity capital of our company has remained on a steady growth path despite increases in your harvesting of profits"
3. "In the last two successive years, the proportion of debts in your firm's capital structure has been on the decrease"
4. "In the last two years, the profit per naira of equity fund invested has increased"

Table 4.11 summarizes the survey's responses.

Table-4.11: Return on Equity

Items	Mean Score	Std Dev	Verdict
Resilience of steady growth rate of equity stake in business due to profit retentions	3.4	1.4	Undecided
Maintenance of steady growth rate of equity stake in business despite increase in profit harvestings	4.7	0.6	Strongly Agree
Steady decline in the proportion of debts in the capital structure	4.4	0.6	Agree
Growth of profit per naira equity invested	3.4	1.3	Undecided
Aggregate	**4.0**	**1.2**	**Agree**

Source: Field Report, 2024.

The sampled companies have an average ROE of four points, which places them in the region of "Agree" according to the recorded mean score of 4.0 out of a possible grade point scale of five. To put it another way, the ROE on average is in the positive region, while it is not quite in the extreme region of expression. The fact that the sampled companies had a standard deviation of 1.2 points indicates that ROE is very variable among them. This provides more evidence that the companies that were sampled have varying levels of profitability in their operations.

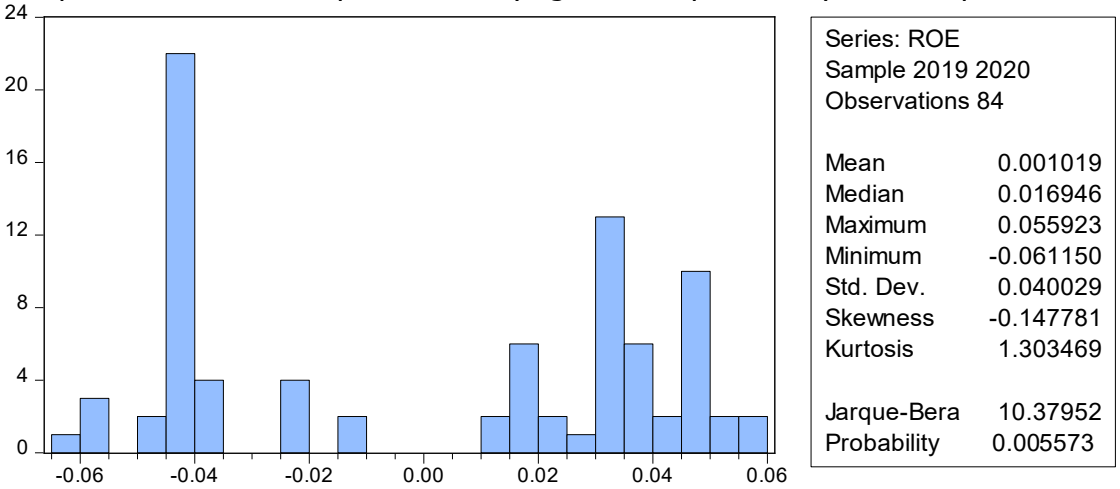

Figure 4.9: ROE of Oil and Gas Companies in Rivers State

Source: EViews output Version 10

Once more, secondary data collected from the industry provides support for the variability hypothesis, which is depicted in figure 4.9. The descriptive statistics presented in figure 4.9 indicate that the average ROE is 0.102 percent, while the median ROE is 1.69 percent. This result is similar to the one earlier observed using primary data analysis. Similarly, the standard deviation (4.0%) relative to the mean (0.102%) strongly suggests a high coefficient of variability, which also shares the same attribute as the primary data analysis.

In order to understand the directions of the spread of our data in measuring ROE, we conducted Principal Component Analysis (PCA) on the four items used to measure ROE. As presented in figure 4.9, the Eigen value obtained from PCA is 1.748 out of 4-point items, translating to 43.7% power. The typical practical use of the Eigen value is to find the direction which the data set has

maximum variance. The higher is the eigenvalue, the higher will be the variance along a covariance matrix's eigenvector direction (principal component).

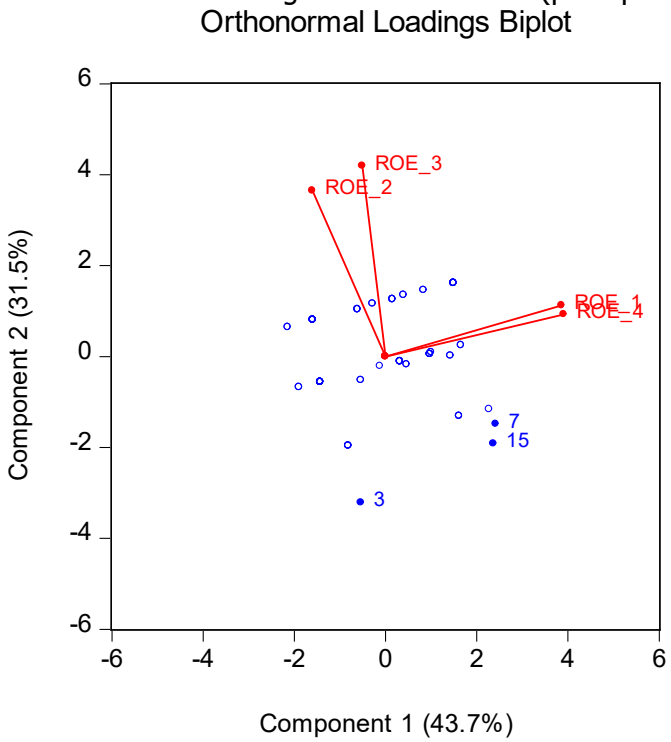

Figure 4.10: Orthonormal Loading Bi-plot of ROE

Source: EViews output Version 10

In the overall, financial performance of the sampled firms show average level of manifestation as reflected in the descriptive statistics using both primary and secondary data. Of the three measures of financial performance used, net profit margin (NPM) and return on assets (ROA) marginally indicate negative direction while return on equity (ROE) is slightly skewed in positive direction.

Figure 4.11 presents secondary data for 2019 (blue) and 2020 (dark brown) on the three measures in a bar chart.

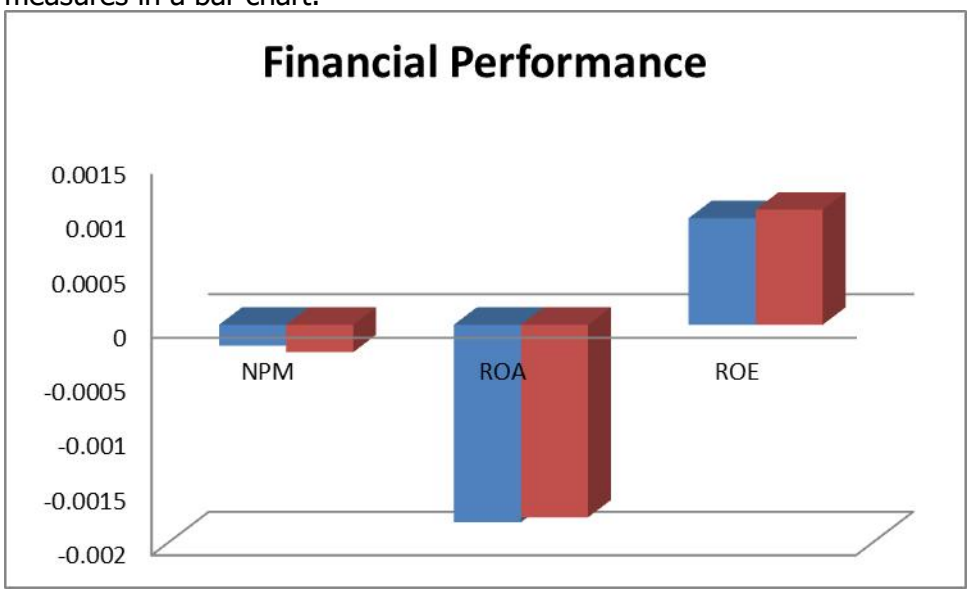

Figure 4.11: Financial Performance based on Secondary Data

Source: EViews output Version 10

The trend from 2019 to 2020 indicates improvements in each of the measures since the dark brown bar appears to be taller than the blue bars in all cases.

Top Management Support

To measure this variable, a total of 7 items were used. Varying degree of manifestation levels of the items were observed, ranging from 3.3 to 4.8 based on a 5-point scale. In overall, an average score of 3.80 was recorded with standard deviation of 1.3. The average score implies that a reasonable degree of Top Management Support measures were prevalent in the oil and gas industry in implementing cloud ERP in the industry. However, with the recorded standard deviation, there is sufficient reason to expect slight degree of possibility that actual levels of support received by the cloud system usages differ among the sampled firms.

Table 4.12: Top Management Support

Items	Mean Score	Std Dev	Verdict
Top Management's provision of administrative assistance in ERP implementation	3.3	1.2	Undecided
Staff encouragement by top management to use cloud ERP	3.5	1.3	Agree
Top Management's awareness of cloud ERP benefits	3.6	1.4	Agree
Adequacy of resource provision by top management for implementation and continued usage of cloud ERP	3.4	1.4	Undecided
Top Management's awareness of cloud ERP risks in ERP implementation	4.8	0.5	Strongly Agree
Top Management's commitment to ensuring firm's achievement of competitive advantage through use of cloud ERP	4.4	0.5	Agree
Strategic importance of cloud ERP usage to top management	3.4	1.3	Undecided
Aggregate	**3.8**	**1.3**	**Agree**

Source: Field Report, 2024.

The constructs' reliability, indicator reliability, convergent validity, and discriminant validity were evaluated with the help of a measurement model that was developed with the use of principal components analysis (PCA). The orthonormal loading bi-plot that is shown in Figure 4.12 demonstrates that just one of the first two derived components can explain 60.1% of the overall variation. This particular component has an Eigen value of 4.201. A sufficient degree of internal consistency can be inferred from the fact that the Cronbach alpha value for all seven items is 0.814. As a result of the fact that the statistics presented above exhibit a high degree of measurement reliability and validity, the calculated principal component is capable of functioning as an adequate representation of Top Management Support (TMS).

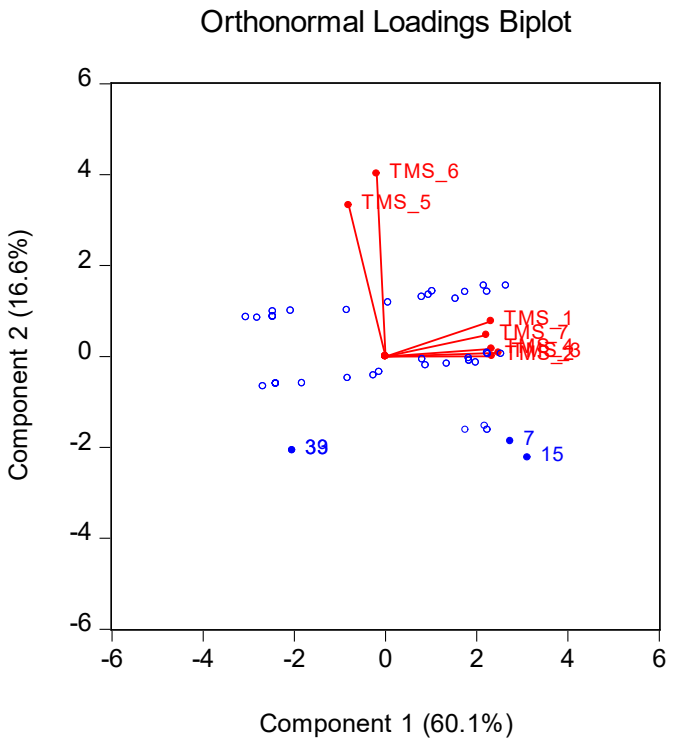

Figure 4.12: Orthonormal Loading Bi-plot of Top Management Support
Source: EViews output Version 10

Hypothesis Testing under Bivariate Analytical Framework
In this part of the analysis, the research variables are paired with one another with the goal of investigating correlations that can provide insight into the confirmation or rejection of hypothesised relationships. The correlational approach makes up the bulk of the methodology. The general framework for testing relational hypotheses contains a number of essential components, one of which is the correlational analysis of variables. Because the analysis involved pairing variables to find out their underlying connection, the Pearson's Product Moment Correlation was the method that was applied in this study. This phase is critical to the research project because it enables an early glimpse of the potential for multicollinearity effect combinations.

Table 4.13: Correlation Matrix

Correlation Probability Observations	NPM	ROA	ROE	PVCA	PBCA	CMCA	TMS
NPM	1.000 ----- 45						
ROA	0.988 0.000 45	1.000 ----- 45					
ROE	0.928 0.000 45	0.931 0.000 45	1.000 ----- 45				
PVCA	0.588	0.609	0.667	1.000			

	0.000	0.000	0.000	-----			
	45	45	45	45			
PBCA	0.278	0.290	0.153	-0.459	1.000		
	0.065	0.054	0.316	0.002	-----		
	45	45	45	45	45		
CMCA	-0.547	-0.576	-0.543	-0.462	-0.439	1.000	
	0.000	0.000	0.0001	0.001	0.003	-----	
	45	45	45	45	45	45	
TMS	0.948	0.971	0.950	0.664	0.207	-0.583	1.000
	0.0000	0.0000	0.0000	0.000	0.173	0.000	-----
	45	45	45	45	45	45	45

Key:

PVCA	***Private Cloud Technologies Accounting***
PBCA	***Public Cloud Technologies Accounting***
CMCA	***Community Cloud Technologies Accounting***
NPM	***Net Profit Margin***
ROA	***Return on Assets***
ROE	***Return on Equity***

Source: EViews output Version 10

Multicollinearity is a statistical phenomenon that arises when one predictor variable in a multiple regression model can be predicted with high accuracy from the others (Wikipedia, 2019). It is possible to seek for signs of multicollinearity by using the matrix correlate. This is a reasonable option. According to Gujarati (2004), there is a good possibility that an excess correlation exists when the coefficients of the paired independent variables are 0.8 or higher. This is the threshold at which an excess correlation is considered to exist. In addition, as shown in Table 4.13, the correlation matrix is essential since it contributes to the process of determining the moderator variable's moderating function. This is an important consideration. It offers a concise summary of the connections that may be drawn between the moderator variable and the other variables in the model.

Private Cloud Technologies Accounting and Financial Performance

The Pearson's Product Moment Correlation Coefficient is used to determine the strength and direction of relationship between private Cloud Technologies Accounting (PVCA) and financial performance. Since financial performance is represented in terms of three measures, namely net profit margin (NPM), return on assets (ROA) and return on Equity (ROE), accordingly, correlation coefficients between private Cloud Technologies Accounting and the three measures are respectively calculated using Eviews econometric software version 10. The results are presented in table 4.13.

Therefore, in general, private Cloud Technologies Accounting can be said to associate positively with financial performance as predicted by the resource based theory. Barney (1991) asserts that businesses can acquire a competitive edge by exploiting their resources and capabilities in creative ways (Gupta, Kumar, Singh, Foropon, Chandra, 2018). These resources include the ICT infrastructures at the sole disposal of the firm, such as the private cloud based ERPs. When exploited appropriately, these resources accrue certain benefits to the firm. In the words of Christaukas dan Miseviciene (2012), such benefits manifest in diverse forms, including reduced cost. Cloud computing has the potential to reduce the cost in implementation of software and hardware; network management, and the overall IT. Since companies generally only pay monthly

subscription fee for a number of users with access to application, the IT implementation cost can be kept under strict control (i.e. scalability). Cost savings can also accrue from security maintenance expenses since a number of cloud providers provide high level of security. Web-based systems are actually as secure if not more and have better internal control compared to offline-based/in-house software. Benefits can also accrue from speed of business response; company can easily and quickly access more resource if the necessity to expand their business and global access to resource pool ever arises. Staff, partners, and clients can access and update information whenever and wherever, thereby eliminating the necessity to enter the office.

Public Cloud Technologies Accounting and Financial Performance

Table 4.13 also presents the correlation coefficients between public Cloud Technologies Accounting and the three respective measures of financial performance. Although the respective directions of relationship between public Cloud Technologies Accounting and these measures are similar to those between private cloud and them, the extent of relationship is not as strong.

The correlation coefficient between public Cloud Technologies Accounting (PBCA) and net profit margin (NPM) is 0.278 which has a probability value of 0.065. It implies that increasing use of public Cloud Technologies Accounting associates with greater net profit margin. However, the strength of relationship is not significant at 5% level. This is further proven by the coefficient of determination (i.e., R^2 = 7.73%) which suggests that private Cloud Technologies Accounting can only account for about 7.73% of variability in net profit margin.

In the light of the foregoing results from bivariate analysis, there is strong statistical evidence to support the conclusion that public Cloud Technologies Accounting is positively associated with financial performance but the strength of the relationship is insignificant. However, it is imperative to quickly point out that public model of cloud service delivery, does not have a linear relationship with financial performance (Gupta et al., 2018). This suggests that the professedly positive association does not endure indefinitely. After a certain threshold, a negative relationship becomes feasible. The finding strongly indicates the manifestations of Perez' (2007) views in his argument that there is a problem of vendor lock-in that comes from depending on public clouds vendors. Even more sinister is the possibility of security breach into client's applications hosted on the cloud and thus access and distributes sensitive data (Krutz & Vines 2010). Hence the financial reward/return that goes with this mode of cloud service deliver is clearly not commensurate to the risk, hence an insignificant positive relationship is observed.

Moderating Impact of Top Management Support on Private Cloud Accounting and Financial Performance Relationship

Originally on the relationship between private Cloud Technologies Accounting and net profit margin, the correlation coefficient based on Pearson's Product Moment Correlation is 0.588 with a p-value of 0.000. However, after controlling for the moderating impact of top management support, the coefficient is now -0.1726 with a p-value of 0.0626 as reported in table 4.14 (a).

Table 4.14 (a) Partial analysis of Private Cloud and Financial Performance

Correlation Probability Observations	NPM	ROA	ROE	PVCA
NPM	1.000000 ----- 45			
ROA	0.882964 0.0000 45	1.000000 ----- 45		

ROE	0.283079	0.116645	1.000000	
	0.0626	0.4508	-----	
	45	45	45	
PVCA	-0.172638	-0.196293	0.154198	1.000000
	0.2624	0.2016	0.3176	-----
	45	45	45	45

Source: EViews output Version 10

Since the direction (i.e. change of sign from + to -) and strength (i.e. from p-value < 0.05 to p-value > 0.05) of the relationship changed, it is conclusive that TMS has significant moderating impact on how private Cloud Technologies Accounting relates with net profit margin.
Also, based on Pearson's Product Moment Correlation, the correlation coefficient between private Cloud Technologies Accounting and return on assets is 0.609 with a significance level of 0.000. After correcting for the moderating effect of support from senior management, the coefficient is now -0.196 with an approximate p-value of 0.202, as shown in table 4.14(a). Given the direction (i.e. change of sign from + to -) and strength of the relationship (i.e. from p-value 0.05 to p-value > 0.05) changed after adjusting for the moderating impact of TMS, it is evident that TMS has a substantial moderating effect on the relationship between private Cloud Technologies Accounting and ROA.
Finally with respect to ROE, the PPMC was 0.667 and it p-value was 0.000. However upon controlling for the moderating effect of TMS, the correlation coefficient became 0.154 with an approximate p-value of 0.317 as reported in table 4.14(a). Although in the case of ROE, there was no change in direction, but the significance of the relationship changed.
Therefore, in conclusion, there are enough statistical bases to infer that TMS significantly moderates how private Cloud Technologies Accounting relates with financial performance.

Moderating Impact of Top Management Support on Public Cloud Accounting and Financial Performance Relationship

Under the correlational analysis framework based on PPMC, public Cloud Technologies Accounting produced result as 0.278 (p-value = 0.065 > 0.05). After controlling for the moderating effect of Top Management Support, the partial analysis result became 0.263 (p-value = 0.085). Since there is neither change in direction nor change in coefficient significance, there is no statistical basis upon which to draw conclusion on the moderating effect of TMS on the relationship between public Cloud Technologies Accounting and net profit margin.

Table 4.14(b) Partial analysis of Public Cloud Technologies Accounting and Financial Performance

Correlation Probability Observations	NPM	ROA	ROE	PBCA
NPM	1.000000			

	45			
ROA	0.882964	1.000000		
	0.0000	-----		
	45	45		

ROE	0.283079	0.116645	1.000000	
	0.0626	0.4508	-----	
	45	45	45	
PBCA	0.262874	0.378349	-0.141437	1.000000
	0.0847	0.0113	0.3598	-----
	45	45	45	45

Source: EViews output Version 10

Furthermore, by contrasting the correlational analysis result earlier obtained against the result which is reported in table 4.14(b) with respect to ROA, it is easily discerned that though direction-wise there is no change, a remarkable change was recorded with regards to coefficient significance. The original coefficient was 0.290 with a probability value of 0.054. However after controlling for the moderating effect of TMS, the coefficient improved to 0.378 with a p-value of 0.0113. Therefore it is conclusive statistically that TMS exerts significant degree of moderation on how public Cloud Technologies Accounting associates with return on assets.

In conclusion therefore, the extent to which TMS moderates the relationship between public Cloud Technologies Accounting and financial performance depends on which index is used to measure or represent financial performance. If net profit margin is used, top management support is not likely to exert any significant moderating effect. However if return on assets or return on equity is used, public Cloud Technologies Accounting is likely to have significant moderating effect.

Cloud Technologies Accounting and Net Profit Margin

In this subsection, the model to be subjected to test is presented as follows:

$NPM_i = a_o + a_1PVCA_i + a_2PBCA_i + a_3CMCA_i + U$

The result from regression based on Ordinary Least Squares (OLS) is as presented in table-4.15:

Table-4.15: Regression Result on NPM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PVCA	0.724809	0.059347	12.21307	0.0000
PBCA	0.620342	0.058933	10.52620	0.0000
CMCA	0.353450	0.060857	5.807888	0.0000
C	3.84E-16	0.100755	3.81E-15	1.0000
R-squared	0.849396	Mean dependent var		1.28E-16
Adjusted R-squared	0.838376	S.D. dependent var		1.681202
S.E. of regression	0.675886	Akaike info criterion		2.139102
Sum squared resid	18.72968	Schwarz criterion		2.299694
Log likelihood	-44.12979	Hannan-Quinn criter.		2.198969
F-statistic	77.07878	Durbin-Watson stat		1.663209
Prob(F-statistic)	0.000000			

Source: EViews output Version 10

According to table 4.15, *PVCA* is significantly and positively associated with *NPM* since its p-value is less than 5%; *PBCA* is significantly and positively associated with *NPM* since its p-value is less than 5%; *CMCA* is significantly and positively associated with *NPM* since its p-value is less than 5%. The resulting model is estimated as follows:

$NPM_t = 0.000 + 0.725*PVCA + 0.620*PBCA + 0.353*CMCA$

All the indicators of model goodness-of-fit show high scores. The F-statistic (77.079) and the associated probability value (0.000) confirms that the proportion of net profit margin (*NPM*) variance explained is larger than would be expected if there was no association with Cloud Technologies Accounting at all, thus confirming its *relative* correlation strength. In the same vein, the result yielded 0.838 as adjusted-R^2 (i.e. coefficient of variation), implying high capacity to explain the changing behaviour of net profit margin of the sampled oil and gas companies. In other words, about 83.8% of *NPM* variability is attributable to the joint variability of the three dimensions of Cloud Technologies Accounting.

With regards to autocorrelation effect (see table 4.15), the Durbin-Watson statistic (1.663) significantly allays any worry on its effect. The result also confirms the assurance that our model is not only well-fitted, but it is free of problem with stability, reliability and is good enough for generalizability beyond the sample used, because it meets the necessary requirement of distribution normality of residuals (see figure 4.13).

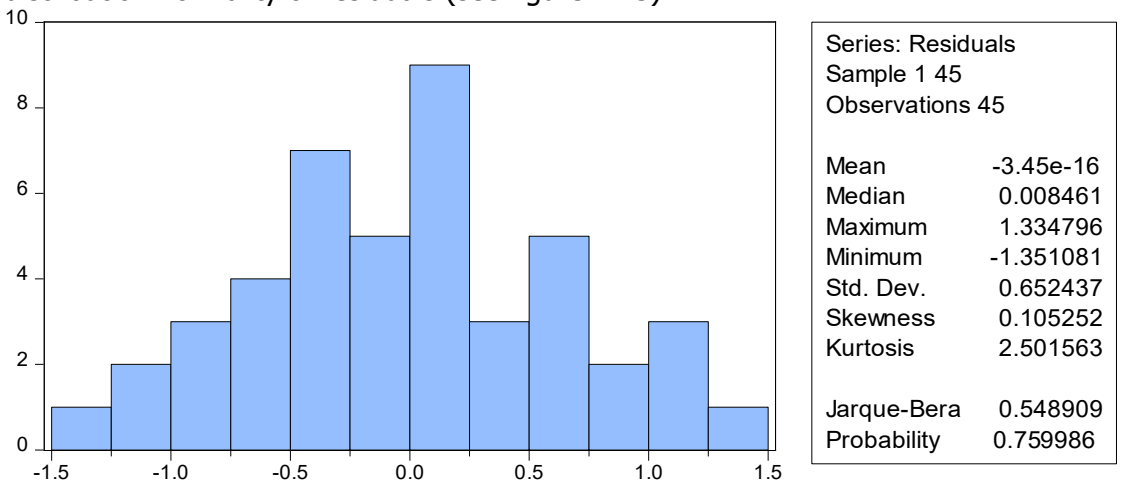

Figure 4.13: Residual Diagnostic on Normality of NPM Residuals Distribution

Source: EViews output Version 10

Before proceeding to the next stage of interpreting the model, it is imperative to test for multicollinearity first (Hair, Risher, Sarstedt, & Ringle, 2019). The phenomenon known as multicollinearity occurs when one predictor variable correlates with more than one other predictor. Although the multicollinearity does not have an effect on the performance of the model, it does have an effect on how well it can be interpreted. Rule of thumb commonly used in practice is if a VIF is > 10, it is an indication of high multicollinearity. Result of the test is reported in table-4.16.

Table-4.16: Variance Inflation Factor Report on NPM

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
PRIVATE_CLOUD	0.003522	4.097952	4.097952
PUBLIC_CLOUD	0.003473	3.992642	3.992642
COM_CLOUD	0.003704	4.008489	4.008489
C	0.010152	1.000000	NA

Source: EViews output Version 10

As reported in table-4.16, the VIFs values drift around 4, indicating that we are in good shape, and can rely on the results obtained.
Therefore with respect to hypotheses 1, 4 and 7, we conclude that there is sufficient statistical basis to reject the null hypotheses.

Cloud Technologies Accounting and Return on Equity
In order to verify the hypotheses that propose a connection between aspects of Cloud Technologies Accounting and return on equity, it is necessary to investigate whether or not the coefficients of Multiple Linear Regression of *ROE* on these aspects of Cloud Technologies Accounting are statistically significant. Thus the model of interest to put to the test is:
$ROE_i = c_o + c_1PVCA_i + c_2PBCA_i + c_3CMCA_i + \lambda$
Table-4.19 presents an *Eviews* output result of the MLR regression of ROE. In accordance with the result that is reported, *PVCA* is significantly and positively associated with *ROE* because the p-value of the *PVCA* coefficient is less than 0.05 (i.e. 5 percent); *PBCA* is significantly and positively associated with *ROE* because the p-value of the former's coefficient is less than 0.05; and *CMCA* is positively associated with *ROE* because the p-value of *CMCA* is less than 0.05. In addition, *CMCA* is significantly and positively associated with *ROE*.

Table-4.19: Regression Result on ROE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PVCA	0.543128	0.054969	9.880702	0.0000
PBCA	0.407144	0.054585	7.458869	0.0000
CMCA	0.228984	0.056367	4.062373	0.0002
C	4.76E-16	0.093322	5.10E-15	1.0000
R-squared	0.793994	Mean dependent var		6.91E-17
Adjusted R-squared	0.778920	S.D. dependent var		1.331417
S.E. of regression	0.626021	Akaike info criterion		1.985822
Sum squared resid	16.06800	Schwarz criterion		2.146414
Log likelihood	-40.68100	Hannan-Quinn criter.		2.045689
F-statistic	52.67430	Durbin-Watson stat		1.614884
Prob(F-statistic)	0.000000			

Source: EViews output Version 10

On the other hand since the p-value of the intercept is higher than 5%, this means that it is statistically insignificant, which suggests that the intercept is close to being equal to zero. The following is a presentation of the approximated equation for *ROE*:
$ROE_i = 0.543*PVCA_i + 0.407*PBCAi + 0.229*CMCA_i$
The F-statistic, Multiple-R^2 criterion, Adjusted-R^2 criterion, Akaike info criterion, Schwarz criterion, and Hannan-Quinn criterion all point to the fact that all components of the model's goodness-of-fit have been satisfied. For example, the F-statistic (52.674) and the associated probability value (0.000) confirm that the three dimensions of Cloud Technologies Accounting are jointly capable of predicting return on equity (ROE) with a reasonable level of precision. This is a fact that would not have been possible if there was not a reliably strong functional relationship linking them. If there was no such relationship, the F-significance would have been much greater than 5%. The results also showed an adjusted R^2 that was roughly equal to 79.4%, which indicates that the three components of Cloud Technologies Accounting have a high ability to jointly account for the variable behaviour of the return on equity of the sampled oil and gas companies. The Durbin-

Watson statistic of 1.615 makes it so that we do not need to be concerned about the potentially destabilising influences that autocorrelation could have on our findings.
The output of the ROE model was subjected to a normality test so that we could be positive that the result satisfies one of the essential econometric requirements of multiple linear regression (MLR) technique. The outcome of this test can be found in table 4.19.

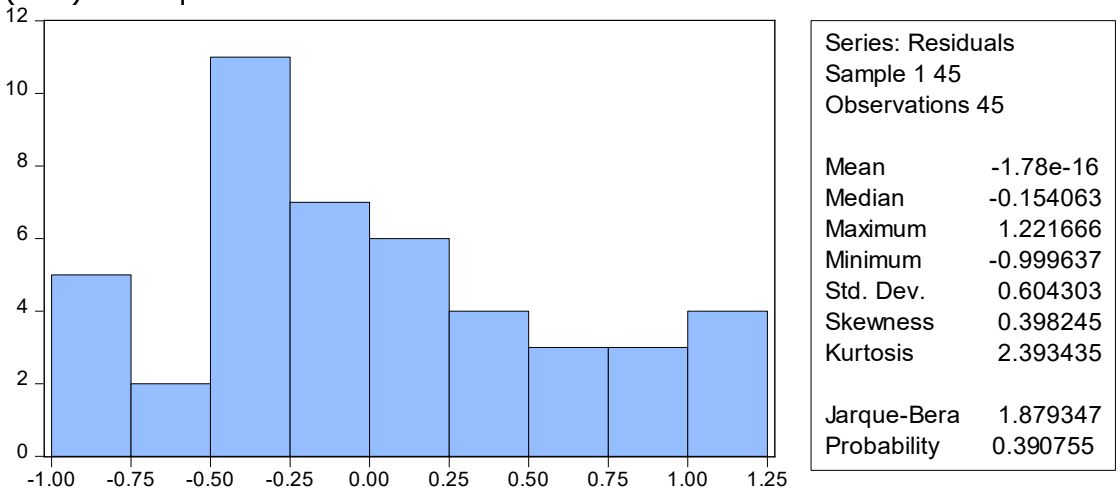

Figure 4.15: Residual Diagnostic on Normality of ROA Residuals Distribution
Source: EViews output Version 10

The conclusion that can be drawn from this is that our model is not only accurate, but that it is also devoid of issues with stability and reliability, and that it is of a quality that allows it to be generalized beyond the sample that was examined.
Before placing any trust in the results that have been reported, it is essential to perform a test of multicollinearity. This is because there is a possibility that the three components of Cloud Technologies Accounting could have a high level of interactions with one another, as well as the possibility that these interactions could have an inflationary effect on the respective standard errors of their coefficients. In this context, the Variance Inflation Factor (VIF) is the most useful piece of analytical tool. Because a high VIF is an indication of substantial multicollinearity, it cannot be used in scientific study if it has a value that is larger than 10. This is because it is a general rule of thumb. The findings of the examination that was carried out are presented in Table 4.19.

Table-4.20: Variance Inflation Factor Report on ROE

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
PVCA	0.003022	4.097952	4.097952
PBCA	0.002980	3.992642	3.992642
CMCA	0.003177	4.008489	4.008489
C	0.008709	1.000000	NA

Source: EViews output Version 10

The values of the VIFs are limited within acceptable threshold as seen in table 4.20, which is an indicator that our findings are reliable and can be depended upon.
Therefore, we have arrived at the conclusion that there is sufficient statistical support to refute the null hypotheses in regard to the stated hypotheses (H_{03}, H_{06}, and H_{06}) that are pertinent to this section of the analysis.

Moderating Impact of Top Management Support on the Relationship between Cloud Technologies Accounting and Financial Performance

Earlier on using bivariate analytical basis, we have examined the moderating influence of top management support (TMS) on the relationship between Cloud Technologies Accounting and financial performance where the results indicate that TMS can moderate the respective impacts of private and community Cloud Technologies Accounting on financial performance for all three measures of financial performance. However, in this section we present analysis of the same moderating influence of TMS but based on multivariate analytical framework. The difference lies in the fact that in real life practice, unlike the assumption underlying bivariate which is two occurring at a time, all three components of Cloud Technologies Accounting simultaneously interact with one another and together with financial performance. Hence multivariate analysis tends to be more realistic and the approach is completely different. For instance, the moderating influence of a moderator variable in a multiple linear regression (MLR) technique can be confirmed if the coefficient of any of the interactions is significant at a 5% level, leading to an improvement in the adjusted R^2, according to Fairchild & Mackinnon (2009), who posited that the moderating effect is confirmed if the coefficient of any of the interactions is significant. In line with this notion, we present results according to the three respective measures of financial performance in the following subsections.

Moderating Role of Top Management Support under Net Profit Margin as Proxy of Financial Performance

Under the consideration of net profit margin (NPM) as financial performance, the model for testing the moderating role of Top Management Support is presented as follows:

$$NPM_i = a_o + a_1PVCA_i + a_2PBCA_i + a_3CMCA_i + a_4TMS_i + a_5TMS*PVCA_i + a_6TMS*PBCA_i + a_7TMS*CMCA_i + U$$

The regression result is reported in table-4.20 as follows:

Table-4.21: Moderated Regression of Net Profit Margin

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PVCA	0.251583	0.117320	2.144417	0.0386
PBCA	0.234962	0.084904	2.767398	0.0088
CMCA	0.154157	0.062008	2.486075	0.0176
TMS	0.548780	0.119859	4.578566	0.0001
TMS*PVCA	0.025133	0.041473	0.606011	0.5482
TMS*PBCA	0.030833	0.037037	0.832491	0.4105
TMS*CMCA	0.032387	0.028650	1.130423	0.2656
C	-0.034379	0.191375	-0.179642	0.8584
R-squared	0.922217	Mean dependent var		1.28E-16
Adjusted R-squared	0.907501	S.D. dependent var		1.681202
S.E. of regression	0.511314	Akaike info criterion		1.656147
Sum squared resid	9.673369	Schwarz criterion		1.977331
Log likelihood	-29.26330	Hannan-Quinn criter.		1.775881
F-statistic	62.66883	Durbin-Watson stat		2.096933
Prob(F-statistic)	0.000000			

Source: EViews output Version 10

Based on the reported result in table 4.21, none of the interaction terms is statistically significant. Though the explanatory capacity of the model is somewhat better (i.e. Adjusted R-square increases from 0.838 to 0.907), mostly because of significant interaction between TMS and NPM, none of the three components of Cloud Technologies Accounting has significant interaction with TMS. Hence there is no significant moderating impact of TMS on how Cloud Technologies Accounting associates with NPM.

Moderating Role of Top Management Support under Return on Equity as Proxy of Financial Performance

Using return on equity (ROE) as a substitute of financial performance, the following model can be used to determine whether or not top management support serves as a moderating factor:

$ROE_i = c_o + c_1PVCA_i + c_2PBCA_i + c_3CMCA_i + c_4TMS_i + c_5TMS*PVCA_i + c_6TMS*PBCA_i + c_7TMS*CMCA_i + \lambda$

The estimated coefficients of the moderated regression are reported in table-4.23. According to the result that was obtained, not one of the interaction terms reaches the threshold of statistical significance. Even though the model's explanatory capacity is somewhat improved (i.e. Adjusted R-square increases from 0.794 to 0.892), primarily due to significant interaction between TMS and ROE, none of the three components of Cloud Technologies Accounting have significant interaction with TMS. This is despite the fact that the model's explanatory capacity is somewhat improved. As a result, the TMS does not have a major moderating impact on the way that Cloud Technologies Accounting is associated with ROE.

Table-4.23: Moderated Regression of Return on Equity

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PVCA	-0.000176	0.100307	-0.001757	0.9986
PBCA	0.015366	0.072591	0.211685	0.8335
CMCA	0.017966	0.053016	0.338882	0.7366
TMS	0.620024	0.102477	6.050360	0.0000
TMS*PVCA	0.046284	0.035458	1.305316	0.1998
TMS*PBCA	0.023285	0.031666	0.735333	0.4668
TMS*CMCA	0.017557	0.024496	0.716744	0.4780
C	-0.183433	0.163623	-1.121073	0.2695
R-squared	0.909341	Mean dependent var		6.91E-17
Adjusted R-squared	0.892189	S.D. dependent var		1.331417
S.E. of regression	0.437166	Akaike info criterion		1.342802
Sum squared resid	7.071212	Schwarz criterion		1.663986
Log likelihood	-22.21304	Hannan-Quinn criter.		1.462536
F-statistic	53.01729	Durbin-Watson stat		1.779683
Prob(F-statistic)	0.000000			

Source: EViews output Version 10

Thus, in summary, out of the three respective proxies of financial performance used as dependent variable on the three components of Cloud Technologies Accounting, only return on assets scaled through as representative of financial performance which relationship with community Cloud Technologies Accounting alone is subject to moderation by Top Management Support.

Reliability of Findings

The overview of the results from both of the corresponding inferential studies can be seen in table 4.23. Only two types of inferential analysis—bivariate and multivariate analyses—were used in this

particular research thesis. These analyses were used to draw inferences from the data. The results of these two types of analyses may, at some points, converge or diverge due to some extraneous effect of a third variable that was not considered in the analysis, or/and contemporaneous nature of variable manifestation which bivariate analysis ignores but taken into account by multivariate analysis. For the purpose of this thesis, however, multivariate analysis results are deemed to be more important than those obtained through bivariate analysis whenever there is a conflict between the two types of findings. This is due to the fact that multivariate statistics is more realistically applicable to situations in which the outcomes of numerous dependent variables are simultaneously determined by more than one factor.

Table-4.24: Summary of Findings

Hypotheses	*a priori* Expectation	Actual Finding under Bivariate Analysis		Actual Finding under Multivariate Analysis		Verdict
H_{01}:	+	+	***	+	***	Reject
H_{02}:	+	+	*	+	***	Reject
H_{03}:	+	-	***	+	***	Reject
H_{04}:	+	+	***	+	***	Reject
H_{05}	+	+	*	+	***	Reject

Key *+/-* *is an indication of relationship direction*
*** *is an indication for significance at 10% level*
**** *is an indication for significance at 5% level*
***** *is an indication of significance at 1% level*
Source: EViews output Version 10

In this instance, there is consistency rate of 66.67% based on sign-to-sign convergence between the two analytical frameworks. Same rate of consistency is recorded on the basis of coefficient significance. We can therefore say that on the basis of multivariate analysis, all our *a priori* expectations are confirmed.

CONCLUSIONS

According to the findings of the study, the utilisation of Cloud Technologies Accounting is one factor that leads to the enhanced financial performance of oil and gas businesses in Rivers State. Cloud Technologies Accounting allows businesses to improve their customer service while simultaneously lowering their operating expenses and expanding their profit margins. Organizations are free to concentrate on the most important aspects of their operations without being distracted by concerns that the system will consume too much of their time or resources. The ineffectiveness of conventional methods of keeping financial records has led to the widespread adoption of Cloud Technologies Accounting. To ensure that businesses are able to meet the requirements of the 21st century, it is essential for the management of companies to upgrade their accounting information systems to the most up-to-date versions. The new software places an emphasis on a different kind of data processing and cloud-based storage architecture. The term "Cloud Technologies Accounting" refers to the practise of gaining access to financial data and software via an internet browser. The software is made available on a subscription basis, and the data are kept on a server located in another location. Instead of focusing on a specific piece of software, piece of hardware, or network infrastructure, the model's utilisation is solely predicated on what the users hope to accomplish. Because of this, people often refer to Cloud Technologies Accounting as task-centric.

RECOMMENDATIONS

1. The government should provide high-quality data centers to motivate companies to invest in Cloud Technologies Accounting. Some companies are scared of patronizing low-quality data centers for obvious reasons. Companies in this category will certainly be rest assured if government invests in this direction.
2. Businesses should consider using Cloud Technologies Accounting infrastructure, especially community cloud model, intensively in conjunction with other resources, and strategically align it with their goals to achieve optimal benefit from Cloud Technologies Accounting. in other words, community Cloud Technologies Accounting model should be balanced with top-management-support to improve the financial performance.

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