



## Information Communication Technology Investment and Public Sector Performance of Southwest Nigeria

\*<sup>1</sup>Sunday Olabanji AWORETAN and <sup>2</sup>Muyiwa Ezekiel ALADE

<sup>1,2</sup>Department of Accounting, Faculty of Administration and Management Sciences, Adekunle Ajasin University, Akungba-Akoko, P.M.B. 001, Ondo State, Nigeria

Corresponding Author: Sunday Olabanji AWORETAN

### Abstract

The study examined the relationship between the distribution of resources to Information Communication Technology (ICT) and the efficiency of the Public Sector in the south-western part of Nigeria. Operating performance and solvency were used as indicators for this analysis. Data was obtained from the yearly reports of the six states located in southwest Nigeria. The sample consists of the six states located in southwest Nigeria. All the data gathered was analyzed using the panel Granger Causality technique within the panel VAR framework using Eviews 13. The findings from the Granger causality test reveal that the operational performance of states in the southwest region is significantly influenced by investments in information communication technology. However, this impact is observed only when considering a significance level of 0.05. However, there is no evidence of a causal relationship from the operating performance to the investment in information communication technology of the states. The study failed to find any noteworthy granger causal connection between ICT investment and solvency. The findings of this study suggest that investing in ICT has an impact on the operational performance. It is suggested that state governments should increase their investment in ICT to improve operational efficiency, while also focusing on its correlation with other factors. The stakeholders need to give importance to incorporating ICT investment into daily operations, while the States should broaden their investment portfolios beyond just ICT to improve overall financial well-being, particularly in areas that have a direct influence on long-term stability.

**Keywords:** Information communication technology investment, ICT, public sector performance, southwest Nigeria, operating performance

### Introduction

Globally, a lot of people are increasingly investing in Information Communication Technology (ICT) because everything is now driven by ICT, Nigeria being not in exception. In the 21st century, daily lives of individuals and organisations depend more on ICT. The Nigerian MDAs like their counterparts globally, make use of ICT as well as internet driven technology for most of their activities shifting from analogue of digital system for both official and private engagements. Attention of the private and public sectors have been drawn on the needs to invest in ICT. The public sectors are investing serious in ICT in the area of Tax collection and administration, Budgeting and Treasury management among others. In the same vein the private sector investment in the area of medical, production, marketing, manufacturing and services industries cannot be underestimated. With the huge amount invested in ICT it has in small measure enhanced performance through timely delivery of tasks, solving complex issues and providing real-

time information.

The Federal Government initiated the Public Financial Management (PFM) as a component of its Economic Reforms and Governance Project (ERGP) with the aim of strengthening governance and accountability, addressing corruption, and enhancing service provision. Several changes have been made in the public sector, such as the adoption of the Treasury Single Account (TSA). The Government Integrated Financial Management Information System (GIFMIS) has been introduced and the Integrated Personnel and Payroll Information System (IPPIS) has been integrated. Additionally, the National Chart of Account (NCoA) has been established. These initiatives (reforms) is driven by ICT and is designed to improve government financial performance. Most States in the southwest Nigeria have struggled to effectively meet their obligations such as provision of good roads networks, infrastructure, and improved standard of living for their citizens among others. The connection between performance and information

communication technology (ICT) is highly significant. ICT as defined by Mudasir et al. (2015) <sup>[51]</sup>, is centered on the use of technology through devices such as desktop computers, laptops, wireless connections, software, and data storage, among other tools. Digital technologies are increasingly being integrated into various government activities and processes worldwide. The significance of ICT is increasing in the financial plans of countries due to the extensive investments made in public ICT infrastructure. The reason for this is the requirement for careful planning, which has made it necessary to maximize the use of public funds for ICT in order to achieve effectiveness, consistency, long-term viability, and financial success, among other benefits.

Many research studies have been undertaken to assess the financial performance of government institutions. One notable example is the research conducted by Ejoh and Ejom (2014) <sup>[33]</sup>, which sought to analyze the correlation between internal control and financial performance in a Nigerian tertiary institution. Nevertheless, the study did not conclusively establish a direct influence of internal control on the organization's financial performance. Another study conducted by Carl et al. (2018) <sup>[20]</sup> examined the impact of partisan political control on the financial performance, structure, and outcomes of nursing homes in the United States, both for-profit and not-for-profit. The study conducted by Regita et al. (2020) <sup>[61]</sup> investigated the impact of different factors on the financial performance of District/City Local Governments in Sulawesi Island, Indonesia. These factors included fiscal balance transfer, local own-source revenue, local government size, and capital expenditure. The financial performance in Indonesia was analyzed in a research conducted by Abdalftah (2023) <sup>[1]</sup>, focusing on the influence of government spending and government size.

However, there is still dearth of information regarding the contribution of ICT investment to performance of states in Nigeria whether it reflects in the financial performance indicators of the state government despite the huge amount invested in ICT. The focus of the study is on the southwest state governments in Nigeria considering the various efforts of Government towards the exertion of ICT in their financial management procedures. This paper has addressed the need to establish the connection between ICT investment and the public sector performance in southwest Nigeria.

## 2. Materials and Methods

### 2.1 Literature Review

This section provided an overview of the concepts and understanding of the extent and framework of the issue. It concisely clarified the variables that are influenced by others and those that are not.

### 2.2 Conceptual Review

#### 2.2.1 Information and communication technology (ICT)

According to Enomate and Audu (2021) <sup>[34]</sup>, information and communication technology (ICT) encompasses computer-based technologies that improve the electronic acquisition, handling, and transfer of information, which allow firm to have competitive advantage in the global market. Ashrafi and Murtaza (2008) <sup>[9]</sup> identified ICT technologies to include the hardwares (Laptops, desktop etc.) and software.

According to Spanos *et al.*, (2002) <sup>[65]</sup>, ICT involves the assembly, storage, administration and electronic transfer of information. Enomate and Audu (2021) <sup>[34]</sup>, posited that ICT is now generally acceptable as the last resort for all organisations irrespective the size, nature in private sector. Therefore, in order to provide a better and stronger platform for effective internal control systems in financial management, investment on ICT is very pivotal as opined by O'Brien and Marakas (2010) <sup>[55]</sup>. Preece (2003) <sup>[59]</sup>, explored some benefits of ICT to SMEs which includes quality service, customer satisfaction, soaring productivity, improved financial performance among others. According to Pavlshyn (2016) <sup>[57]</sup>, the organization felt compelled to automate its financial analysis as a result of advancements in information and digital technologies.

#### 2.2.2 Performance

Scholars have approached the concept of "performance" from various perspectives. According to Beaver (2006) <sup>[17]</sup>, performance can be understood as the combination of economy, efficiency, and effectiveness within a specific program. The Corporate Finance Institute (CFI) TEAM (2022), explained financial performance as a complete evaluation of a company's overall financial performance and financial position.

According to Dumitrascu and Dumitrascu (2003) <sup>[30]</sup>, financial performance provides insights into both the measurable and intangible aspects of an organization's economic activity. The structure of annual reports issued by government agencies can pose challenges for individuals with limited knowledge of finance or financial accounting. To gain a complete understanding and evaluation of the information provided in financial reports such as the Consolidated Statement of financial performance, Consolidated Statement of financial position, Consolidated statement of change in Net Asset/Equity, Consolidated Statement of Cash flow, and Consolidated Statement of comparison of Budget and Actual, one must thoroughly analyze and interpret the data, individuals need to possess a wide range of skills and undergo comprehensive training as a professional accountant, which may involve obtaining certifications like the Chartered Accountant or a similar qualification.

Oktalina (2020) <sup>[56]</sup> is of the opinion that financial position of an organisation is achieved for coordination, control and decision-making purposes after the financial performance have been carried out with the examination of relevant financial data from the financial statement. For this reason, the financial management is accountable for presenting a comprehensive overview of their organization's financial transactions.

Muhamad *et al.*, (2021) <sup>[52]</sup>, is of the opinion that organization needs financial information that will enhanced its financial decision-making. This is based on the accrual accounting system and the administrative restructuring that affects the government's finance efficiency. This submission is in line with the decision usefulness theory, agency theory and the new public management theory

Carmeli (2002) <sup>[22]</sup> measures the financial performance of proxies using indicators such as liquidity, balance in the fiscal year, solvency, and municipal development. Therefore, if government invest in ICT, it will increase

transparency in handling funds in the organization thereby promoting financial performance.

### 2.2.2.1 Operating Performance

According to the research conducted by Murata and Katayam (2009) <sup>[53]</sup>, the overall performance of an organization encompasses both monetary and non-monetary outcomes. The assessment of a company's ability to use its resources efficiently and achieve its goals and objectives is crucial in determining its financial strength. According to Azim (2015) <sup>[14]</sup>, there are various metrics that can be used to evaluate operational performance, such as return on equity, the revenue per employee ration, operating cycle and the ratios, return on asset and asset turnover ratio. According to Edwins (2017) <sup>[31]</sup>, operating surplus/(deficit) can be determined by calculating the disparity between operating income and operating expenditure, divided by the total revenue for the given time frame. Cosequently, if government invest in ICT, it will have the potential to increase productivity in the business organization, promote quick access to information which in turn quickens service delivery, and reducing the costs of doing business thereby improving operating performance.

### 2.2.2.2 Solvency

Solvency denotes ability to repay liabilities that are more than 12 months includes interest on those debts. According to Bardia (2006) <sup>[15]</sup>, solvency serves as a crucial foundation for a business organization, determining its long-term growth and stability. Solvency serves as an indicator for the viability of an organization. It assesses the long-term financial well-being and ability to sustain operations of the entity. According to solvency can be calculated as Debt-to-asset ratio (Total Liabilities/Total Assets). Since there is claim that investment in ICT improve performance, it is envisage that it should granger cause solvency of the government because of their relationship. Ji P. *et al.* (2020) <sup>[40]</sup> found out that investment in ICT improved the solvency of firm enterprises in China.

## 2.3 Theoretical Review

For the purpose of this study, two theories were considered. These theories clearly asserts the nexus between ICT investments and financial performance. These theories include stewardship theory and Agency theory.

### 2.3.1 Stewardship Theory

It was affirmed by Donaldson and Davis (1991) <sup>[28]</sup> that in studying accounting research within government organizations, one can adopt a perspective based on stewardship theory. The theory acknowledges that the connection between stewards and principals is crucial for attaining organizational objectives, emphasizing the need for trust as the foundation. This theory relies on the premise that the State government, as an entity, is capable of serving the public's best interests through fulfilling its duties and obligations as specified in the constitution. In the same vein, the society (principals) is expecting economic benefits, welfare objectives among other from the stewards optimally. This theory was applied in the research conducted by Christensen, Kent, and Stewart (2010) <sup>[24]</sup>, Contrafatto and Bebbington (2013) <sup>[26]</sup>, Contrafatto (2014)

<sup>[25]</sup>, Martin and Marcel (2020) <sup>[49]</sup>, Oktalina (2020) <sup>[56]</sup>, and Bayelign, Ayalew, and Sitotaw (2022) <sup>[26]</sup>. One drawback of this theory is that managers may not consistently fulfill their role as responsible caretakers, and they have the ability to occasionally misuse their authority to make choices that do not align with the shareholders' best interests.

### 2.3.2 Agency Theory

In the study of Jensen and Meckling (1976) <sup>[39]</sup>, they informed that a firm act in reponse to the connection or intermediary among various stakeholders. Given that the government and citizens are closely intertwined, it is possible for conflicts to arise in financial policies. The citizen represented the principal, and the State government is the agent. The agent is expected to formulate and implement financial policies for the benefit of the principal. The principal is expected to provide resources in form of taxes, levies, and other legitimate revenues to the agent to carry outs is statutory obligations. The law requires governments to provide citizens with comprehensive information on their achievements and financial performance. When the government shares accurate information, it helps to enhance public understanding of how the government is run and instill confidence in citizens. The theory was put into practice in the research conducted by Assagaf and Ali (2017) <sup>[10]</sup>, Sari and Turino (2018) <sup>[63]</sup>, Ahmed and Nganga (2019) <sup>[4]</sup>, and Oktalina (2020) <sup>[56]</sup>. The theory assumed that shareholders and managers are rational actors with well-defined objectives. Moreover, the theory neglects to acknowledge the impact of additional stakeholders such as employees and customers, who could significantly contribute to shaping the achievements of a company.

This research can be analyzed using the principles of stewardship and agency theory. The study was based on the principles of stewardship theory. This is founded on the belief that the State government, as a trusted institution, will faithfully fulfill its responsibilities in alignment with the common good. The primary goal of this theory is to emphasize the importance of dedicating resources to ICT (Information and Communication Technology) so as to improve the government's fiscal performance and address the requirements of the populace. Hence, it can be inferred based on this theory that the fundamental concept of stewardship theory revolves around the principles of fairness and accountability.

### 2.4 Empirical Review

A study has been carried out to investigate the link between the adoption of ICT technologies and the financial outcomes of public organizations or institutions. One instance is when Sebastian (2011) <sup>[64]</sup> found that the implementation of ICT in Indian states resulted in a broader tax base, which in turn led to higher revenue and enhanced administrative effectiveness. Furthermore, a study conducted by Udo and Nkannor (2016) <sup>[66]</sup> aimed to assess the impact of electronic internally generated revenue (e-IGR) on the development of infrastructure in Ebonyi State from 2011 to 2014. The researchers used regression and Pearson correlation analysis as their research methods. Their findings indicated that there is no noteworthy connection between the variables examined. However, the study's duration was not sufficient

to fully observe the impact. Efunboade (2014)<sup>[32]</sup> conducted a study that showed a positive and significant correlation between electronic tax systems (ICT) and tax administration in Nigeria. Similarly, Alade et al. (2014)<sup>[6]</sup> conducted a study investigating the influence of ICT on the budgeting process of the Ondo State Government. The researchers analyzed the data collected from specific MDAs using chi-square analysis, with a significance level of 0.05. The findings demonstrated that the utilization of ICT resulted in significant reductions in time and costs during the budget processing cycle. Similarly, a study conducted by Cüneyt et al. (2016)<sup>[27]</sup> explored the impact of ICT adoption on tax revenue across 157 countries from 1990 to 2013. The results indicated that ICT has a positive effect on the increase of tax revenue. A recent study conducted by Ajewole et al. (2023)<sup>[5]</sup> revealed a significant and positive impact of investing in information communication technology (ICT) on return on asset. Similarly, Brun et al. (2020)<sup>[19]</sup> found a favorable correlation between the utilization of ICT by governments and tax revenue in 96 developing countries worldwide, based on their research spanning from 2005 to 2016.

In the business sector, researchers have conducted studies to examine the correlation between investment in information and communication technology (ICT) and the financial performance of publicly traded companies. One example of such research is the study conducted by Bilikisu and Kabiru (2015)<sup>[18]</sup>, which focused on the influence of IT investment on the financial outcomes of Nigerian banks between 2006 and 2010. The researchers gathered additional data from annual reports, financial statements, and records maintained by the Nigerian Stock Exchange (NSE) and Central Bank of Nigeria (CBN). The study analyzed the variables of IT investment, overall earnings (TR), and overall cost (TC). The findings indicate that IT investment significantly affects the financial performance of Nigerian banks in terms of ROA, ROE, and EPS, with a significance level of 5%. However, the impact on NPM is not statistically significant at either the 5% or 10% significance levels.

A study conducted by Uge (2023)<sup>[67]</sup> investigated the impact of Information Communication Technology (ICT) investments on the operational outcomes of Nigerian insurance companies between 2012 and 2021. The data was analyzed using the ordinary least square (OLS) regression method to examine the correlation between financial performance, specifically net premium income, and three variables: expenditures on information technology, investment in computer equipment, and investment in computer software. The findings indicated that only information technology costs and investment in computer equipment had a noticeable influence on financial performance, while investment in computer software did not have a significant impact. However, it is important to note that the study did not establish a causal relationship between the variables.

The study conducted by Jason et al. (2003)<sup>[38]</sup> analyzed over 50 articles that explored the connection between ICT and productivity in the U.S. economy. The results indicated that higher investments in ICT were linked to enhanced operational performance within the technology sector. Another research conducted by Ji P. et al. (2020)<sup>[40]</sup> examined the influence of ICT on the financial performance of 229 Chinese listed companies from 2011 to 2015. The

findings demonstrated that investing in ICT had a positive impact on the financial stability of the companies, albeit only during the implementation phase. The findings of this study cannot be applied to Nigeria as a whole due to variations in economic development and the implementation of ICT.

Enomate and Audu (2021)<sup>[34]</sup> conducted a research project to explore the impact of information and communication technology (ICT) on the financial performance of non-financial service firms listed in Nigeria. The study focused on a sample of twenty companies across various industries, such as food and beverage, pharmaceuticals, footwear, chemicals, and paints. All of these companies are listed on the Nigeria Stock Exchange. The study analyzed data from 2016 to 2020 and discovered that investing in ICT infrastructure had a beneficial impact on the financial performance of publicly traded non-financial companies. However, the presence of ICT personnel also had a positive effect on the financial performance of non-financial service companies listed in the stock market, although this effect did not reach statistical significance.

## 2.5 Gaps in Literature

The extensive examination of existing literature, including Ahmed and Nganga (2019)<sup>[4]</sup> and Sari and Turino (2018)<sup>[63]</sup>, was found to be irrelevant as it did not take into account the specific circumstances in Nigeria. Moreover, only a few studies, such as Uge (2023)<sup>[67]</sup> and Enomate and Audu (2021)<sup>[34]</sup>, focused on non-financial services firms in Nigeria, making their findings unsuitable for the government sector due to differing motivations. Furthermore, the research carried out by Udo and Nkannor (2016)<sup>[66]</sup> and Efunboade (2014)<sup>[32]</sup> focused exclusively on tax administration. In contrast, the study by Alade et al. (2014)<sup>[6]</sup> focused on analyzing how ICT affects the budgeting process of the State Government, while Metalia and Suhendro's (2022)<sup>[50]</sup> research investigated the factors that influence the financial performance of local government in Indonesia. The results showed that the size of the local government and the audit opinion given by the Audit Board of Indonesia have a positive impact on the financial performance of city government. However, it was revealed that intergovernmental revenues do not have a favorable impact.

Moreover, a research conducted by Ejoh and Ejom (2014)<sup>[33]</sup> explored the correlation between internal control and financial performance in tertiary institutions, excluding Ministries, Departments, and Agencies. Consequently, the study aimed to contribute to the existing understanding of ICT investment in the public sector by examining how ICT investment relates to public sector performance using granger causality analysis.

This study suggests a null hypothesis stating that there is no significant link between ICT investment and the financial performance of Southwest State Nigeria. This hypothesis is backed by a comprehensive analysis of both theoretical and empirical data. This research utilized an ex-post facto research design to conduct the study, encompassing all six states in Southwest Nigeria. Pre-existing data from the Annual reports and accounts of the Office of the Accountant General was employed for this investigation.

These reports spanned from 2016 to 2022 and covered six



states in Southwest Nigeria. The information was publicly accessible on the Accountant General website. The period of the study reflects a time frame within which all the states is believed to have fully been in the use of ICT. The data collected include operating income, operating expenditures, total liabilities and total asset. The independent variable was performance (operating performance and solvency) while the dependent variable was investment in Information Communication Technology. The Granger causality specification can be expressed within the VAR framework as follows:

$$Y_{it} = \sum_i^k X_{1t-i} + \sum_i^k X_{2t-i} + e_t \dots \dots \dots i$$

Where  
 Y = Dependent variables  
 β = Constant  
 X<sub>1</sub> – X<sub>n</sub> = Independent variables  
 e = error margin

For this paper  
 Y = ICT investment = ICTI  
 X<sub>1</sub> = Operating Performance = OP  
 X<sub>2</sub> = Solvency = Sol

An Effort was made to lessen the effects caused by the presence of a significant high quantity of data, the study incorporated the natural logarithm of certain variables. The logarithmic representation of this model is as follows:

$$ICT_{it} = \sum_i^k OP_{1t-i} + \sum_i^k SOL_{2t-i} + e_t \dots \dots \dots ii$$

$$OP_{it} = \sum_i^k ICT_{1t-i} + \sum_i^k SOL_{2t-i} + e_t \dots \dots \dots iii$$

$$SOL_{it} = \sum_i^k ICT_{1t-i} + \sum_i^k OP_{2t-i} + e_t \dots \dots \dots vi$$

**Table 1:** Measurement of Variables

	Definition	Measurement	Sources
Operating Performance (OP)	Independent Variable	Operating income - operating expenditure / Total revenue	Carmeli (2002, 2008) [21, 22]; Pricewaterhouse Coopers (2006) [60]; Atan <i>et al.</i> (2010) [11]; Edwins (2017) [31].
Solvency (Sol)	Independent Variable	Total Liabilities/Total Asset	Pricewaterhouse Coopers (2006) [60]; Adams, (2013) [2]
ICT investment (ICTinv)	Dependent Variable	Log ICT	

Source: Researcher's Compilation (2023)

**3. Data Analysis Technique**

Different statistical measures, including the mean, median, maximum, minimum, standard deviation, and correlation, were obtained through the use of descriptive analysis and inferential statistics. Both descriptive analysis and inferential statistics were employed to conduct comprehensive analyses. The data generated was analyzed using the panel Granger Causality technique, which examined the relationship between past or previous values of independent variables and current or future values of dependent variables. This analysis was performed within the framework of panel VAR using Eviews 13.

**4. Results**

**4.1 Descriptive Statistics**

The descriptive statistics of the variables were conducted in accordance with the study objectives.

According to the information provided in Table 2, it can be observed that an average of ₦1,166,805,630 was designated for ICT in the six states during the given period. The maximum expenditure recorded was ₦7,833,839,000, while the minimum expenditure was ₦7,972,087. The standard deviation of 0.96 suggests a moderate level of variability. The distribution is highly positively skewed (skewness =1.8257), suggesting a tendency towards higher investment values. The kurtosis of 4.80 indicates a leptokurtic distribution, implying a sharper peak and heavier tails than a normal distribution. The Jarque-Bera test strongly indicates a departure from normality (p-value= 0.000).

Also, the operating performance has a mean of 0.26,

Maximum of 0.55, Minimum of -0.02 and shows relatively low variability (standard deviation: 0.16) with a nearly symmetric distribution (skewness: 0.02). The distribution is slightly leptokurtic (kurtosis: 1.86), indicating a moderately peaked distribution. The Jarque-Bera test indicates that the distribution does not significantly depart from normality (p-value: 0.400).

In addition, solvency has a mean of 0.73, Maximum of 4.01, Minimum of 0.11 and exhibits moderate variability (standard deviation: 0.77) and a highly positively skewed distribution (skewness: 3.21), indicating a right-skewed distribution with potential outliers. The kurtosis of 13.21 indicates a highly leptokurtic distribution, suggesting heavy tails and a sharp peak. The Jarque-Bera test strongly indicates a departure from normality (p-value=0.000).

**Table 2:** Descriptive Statistics

	ICTINV	OP	SOL
Mean	1166805630	0.259330	0.732381
Median	59229579	0.246654	0.526589
Maximum	7833839000	0.554254	4.014626
Minimum	7972087	-0.01528	0.108940
Std. Dev.	0.955154	0.157992	0.767965
Skewness	1.825718	0.020669	3.210565
Kurtosis	4.798158	1.863088	13.20780
Jarque-Bera	23.46900	1.833559	206.0259
Probability	0.000008	0.399805	0.000000
Observations	34	34	34

Source: Researcher's Computation (2023)

**4.2 Correlation Analysis**

The correlation matrix as displayed in Table 3 showcased the extent of connection among the variables. There was no significant correlation between Operating Performance (OP and Solvency (SOL). Generally, the variables employed for the study are not strongly correlated. Solvency present weak negative relationship with investment in ICT (-0.0263) respectively, while Operating performance (0.6393).

**Table 3:** Correlation Analysis

Correlation			
Probability	ICTINV	OP	SOL
ICTINV	1.0000		
OP	0.6393	1.0000	
	0.0000	-----	
SOL	-0.2633	-0.3752	1.0000
	-0.1324	-0.0288	-----

Source: Researcher's Computation (2023)

**4.3 Panel Unit Root Test**

The panel unit root test provides two measurements: the PP - Fisher Chi-square and the Levin, Lin & Chu test. The Levin, Lin & Chu test is employed to ascertain the presence of a common unit root in the variable, whereas the PP - Fisher Chi-square assesses the extent of an individual unit root in the cross-section.

All the variable report significant Levin, Lin & Chu test statistics at level, which implies that the variables does not exhibit common unit root. In the same vein, PP - Fisher Chi-square shows that all the variables report exhibit individual stationarity at level. In summary, the test results indicate

that all the variables (SOL, OP and ICTINV) were stationary I(0)) at level. Therefore, Granger Causality among the variables can be examined without first difference.

**Table 4:** Panel Unit Root Test

	Levin, Lin & Chu t		PP - Fisher Chi-square		Remarks
	Test statistics	p-value	Test statistics	p-value	
SOL	-3.07865	0.0010	19.8516	0.0307	I(0)
OP	-4.45356	0.0000	81.1980	0.0000	I(0)
ICTINV	-8.19913	0.0000	36.0380	0.0001	I(0)

Source: Researcher's Computation (2023)

**4.4 Granger Causality tests**

Furthermore, there is no indication of any evidence suggesting that the operating performance is a contributing factor to investment in ICT (F-stat = 0.155; P = 0.696), but investment in ICT granger cause operating performance (F-stat =7.33; P=0.01) in the six southwest states of Nigeria. The test result disproves the null hypothesis, indicating no evidence to support the notion that previous investments in ICT have a causal effect on operating performance.

In the same vein, it was discovered that previous value of ICT investment does not Granger cause Solvency. More so, there is no significant causality in both ways between Operating Performance and Liquidity of the States. From the result of the granger causality, there was significant flow from ICT investment to operating performance, which indicates that fact past ICT investment causes the future operating performance in the states, while the past operating performance does not causes the future and current ICT investment of the states.

**Table 5:** Granger Causality Tests

Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Prob.
OP does not Granger Cause ICTINV	28	0.15570	0.6965
ICTINV does not Granger Cause OP		7.33229	0.0120
SOL does not Granger Cause ICTINV	28	0.33908	0.5656
ICTINV does not Granger Cause SOL		0.67304	0.4197
SOL does not Granger Cause OP	28	0.03098	0.8617
OP does not Granger Cause SOL		0.13463	0.7168

Source: Researcher's Computation (2023)

**5. Discussion**

The absence of a granger causal relationship between ICT investment and solvency of the states government challenges the conventional wisdom that technological investments directly contribute to a state's long-term financial stability. The finding of Ji P. *et al.* (2020) [40] showed that ICT investment improved the solvency of firm which is at variance with the result of this study. This finding from this study prompts a re-evaluation of the factors influencing a state's solvency, indicating that financial health may be contingent on a more intricate interplay of variables beyond technological investments.

The latest research reveals a notable connection between investment in ICT and the operational performance of the states. This indicates that ICT investments may not have a direct influence on liquidity, revenue autonomy, or solvency. It has a noticeable impact on the operational efficiency and effectiveness of the states. This emphasizes

the significance of investing in ICT to improve daily business operations and overall efficiency. The results of this study further supported the conclusions made by Jason *et al.* (2003) [38], demonstrating a favorable association between investments in ICT and the operational performance within the private sector.

**6. Conclusion**

The research examined the correlation between the allocation of funds towards information communication technology and the overall effectiveness of the public sector in the south-western region of Nigeria. The Granger Causality technique was used for this analysis. From the analysis, it was evidenced that information communication technology investment by the southwest state governments' only granger caused the operating performance of the states and operating performance does not granger caused ICT investment. In addition, ICT investment does not granger

caused solvency, and vice versa. This suggests that although ICT investment may not have a direct impact on solvency, it significantly contributes to improving the state's operational efficiency and effectiveness on a daily basis. The study's scope was limited due to the scarce information available in the published annual financial statements of Governments. Some State governments did not disclosed ICT investment in the financial reports and hence, limited data were captured.

## 7. Recommendation

The study recommends that integration of ICT investment into day-to-day operations is crucial for growth and development while the States should also diversify portfolios beyond ICT investment to enhance overall financial health most especially in areas that have direct impact on long-term solvency.

## 8. References

1. Abdalftah E. The Influence of Government Spending and Government Size on Government Performance. *Journal of Research in Business and Management*. 2023;11(1):191-197.
2. Adams RA. *Public Sector Accounting and Finance*. Lagos: Corporate Publishers Ventures. 2013;3(1):54-67.
3. Aggrehl M, Charcle A, Malgwi C, Mercy SA. ICT Investment and Banks Financial Performance in Nigeria. *International Journal of Finance and Accounting*. 2020;9(1):1-6.
4. Ahmed SO, Nganga P. Internal Control Practices and Financial Performance of County Governments in the Coast Region of Kenya. *International Journal of Current Aspects*. 2019;3(5):28-41.
5. Ajewole JO, Seyingbo OA, Olonite OA, Aladetanye TS. The Nexus between Tangible and Intangible Assets and Profitability of Telecommunication Firms in Nigeria. *International Journal of Advance Research in Multidisciplinary*. 2023;1(1):60-68.
6. Alade ME, Abiodun E, Igbekoyi OE. Assessment of the Impact of ICTs on Budget Processing in MDAs of Ondo State, Nigeria. *IOSR Journal of Humanities and Social Science*. 2014;19(12):1-9.
7. Almajali AY, Alamro SA, Al-Soub YZ. Factors affecting the financial performance of Jordanian insurance companies listed at Amman stock exchange. *Journal of Management Research*. 2012;4(2):260-266.
8. Akinsulire O. *Financial Management*. Lagos: El-Toda Ventures Limited; 2014. 7(2):13-25.
9. Ashrafi B, Murtuza M. Use of impact of ICT on SMEs in Oman. *Electronic Journal Information System and Evaluation*. 2008;10(1):125-138.
10. Assagaf A, Ali H. Determinants of Financial Performance of State-owned Enterprises with Government Subsidy as Moderator. *International Journal of Economics and Financial Issues*. 2017;7(4):330-342.
11. Atan RSA, Raman MS, Sawiran N, Mohamed A, Mail R. Financial Performance of Malaysian Local Authorities: A Trend Analysis. In: *International Conference on Science and Social Research*. 2010;5(8):271-276.
12. Awoyemi JO, Awoyemi BO. The Role of Information Technology in Nigerian Economy. *International Journal of Scientific Research in Science and Technology*. 2017;3(6):20-28.
13. Ayodeji OE. Impact of ICT on Tax Administration in Nigeria. *Computer Engineering and Intelligent System*. 2014;6(8):26-29.
14. Azim M, Ahmed H, Khan AS. Operational performance and profitability: An empirical study on the Bangladeshi Ceramic companies. *International Journal of Entrepreneurship and Development Studies*. 2015;3(1):63-74.
15. Bardia SC. *Liquidity Management: A Case Study of TISCO. Towards Better Working Capital Management*. The Institute of Chartered Financial Analysts of India University Press. 2006;11(3):67-87.
16. Bayelign AZ, Ayalew AA, Sitotaw WB. Corporate governance and financial performance in the emerging economy: The case of Ethiopian insurance companies. *Cogent Economics & Finance*. 2022;10(2):11-17.
17. Beaver WH. The information content of annual earnings announcements. *Journal of Accounting Research*. *Empirical Research in Accounting Selected Studies*. 2006:67-92.
18. Bilkisu KUF, Kabiru ID. Impact of investment in Information Technology (IT) on the Financial Performance of banks: Is there a Productivity Paradox? *Journal of Internet Banking and Commerce*. 2015:111-123.
19. Brun JF, Chambas G, Tapsoba J, Wandaogo AA. Are ICT's boosting tax revenues? Evidence from developing countries. 2020:78-85.
20. Carl RB, Andrew DF, Vincent M. The effect of political control on financial performance, structure, and outcomes of US nursing homes. *Health Service Research*. 2018;54(1):167-180.
21. Carmeli A. A Conceptual and Practical Framework of Measuring Performance of Local Authorities in Financial Terms: Analysing the Case of Israel. *Local Government Studies*. 2002;28(1):21-36.
22. Carmeli A. The Fiscal Distress of Local Governments in Israel: Sources and Coping Strategies. *Administration and Society*. 2008;39(8):984-1007.
23. CFI TEAM. *Financial Performance*. [Internet]. 2022 [cited 2023 Mar 5]. Available from: <https://corporatefinanceinstitute.com>
24. Christensen J, Kent P, Stewart J. Corporate governance and company performance in Australia. *Australian Accounting Review*. 2010;20(4):372-386.
25. Contrafatto M. Stewardship Theory: Approaches and Perspectives. *Accountability and Social Accounting for Social and Non-Profit Organizations*. 2014;7(4):177-196.
26. Contrafatto M, Bebbington J. Developing techniques for stewardship: A Scottish study. *Accounting for Social Value*. 2013:31-56.
27. Cüneyt K, Rasim Y, Mustafa U. Does ICT Penetration Enhance Tax Revenue? Panel Evidence. *Journal of Social Sciences*. 2016;1:1-10.
28. Davis FD. A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Result. *Sloan School of*

- Management, Massachusetts Institute of Technology. 1986:32-41.
29. Donaldson L, Davis J. Stewardship Theory or Agency Theory. *Australian Journal of Management*. 1991;16:49-64.
  30. Dumitraşcu RA, Dumitraşcu V. Managementul performanțelor financiare. *Concepte. Modele. Instrumente*. Bucharest: Universitară; 2003:18-29.
  31. Edwins EO. Analysing the Financial Performance at the Municipality of Karibib. *European Journal of Research and Reflection in Management Sciences*. 2017;5(2):2056-5992.
  32. Efunboade AO. Impact of ICT on Tax Administration in Nigeria. *Computer Engineering and Intelligent Systems*. 2014;5(8):26-29.
  33. Ejoh N, Ejom P. The impact of internal control activities on financial performance of tertiary institutions in Nigeria. *Journal of Economics and Sustainable Development*. 2014;5(16):133-143.
  34. Enomate B, Audu IO. Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria. *Bingham International Journal of Accounting and Finance*. 2021;2(2):182-194.
  35. Eshna V. Financial Performance: Understanding the Concepts and its Areas. *International Journal of Research*. 2022;4(1):67-77.
  36. Ewert PJ, Clive C. Assessment of Financial Conditions of South African Municipalities: A Unique Model for KwaZulu- Natal. *Scientific research journal of the College of Economic and Management Sciences*. 2015;23:1-25.
  37. Federal Radio Corporation of Nigeria (FRCN). Management of public funds by the States and bail-out: 24 States owing over N706 billion and their inability to pay their workers salaries and payment of debt obligations to the banks. *Network News Features Editorial Report*. 2015;15.
  38. Jason D, Vijay G, Kenneth LK. Information technology and economic Performance: A critical review of the empirical evidence. *ACM Journal*. 2003;35:1-25.
  39. Jensen MC, Meckling WH. Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics*. 1976;3(4):305-360.
  40. Ji P, Yan X, Yu G. The impact of information technology investment on enterprise financial performance in China. *Chinese Management Studies*. 2020;14(3):529-542.
  41. Gacanja EW. Tax revenue and economic growth: an empirical case study of Kenya. Unpublished MBA, Project, University of Nairobi. 2012:34-45.
  42. Gerard T, Geraldine R, Stephen M. A Framework to Measure the Financial Performance of Local Governments. *Local Government Studies*. 2015:67-78.
  43. Hadi A, Handajani L, Putra INNA. Financial Disclosure based on Web-ICT Determinants: Its Implications for Local Government Financial Performance in Indonesia. *International Research Journal of Management, IT and Social Sciences*. 2018;5(1):72-85.
  44. Hamid B. Impacts of derivatives usage on Firm Value: Evidence from Non-Financial Firms of Pakistan. *Journal of Management Research*. 2013;5(4):120-130.
  45. IFAC, IPSASB. Transition to the Accrual Basis of Accounting: Guidance for Public Sector Entities Study. *International Federation of Accountants*. 2011;14.
  46. Krejcie RV, Morgan DW. Determining sample size for research activities. *Educational and Psychological Measurement*. 1970;30:607-610.
  47. Local Government Association of South Australia. Financial indicators: Financial Sustainability Program Information Paper. Adelaide: LGA; 2012:9.
  48. Martin MK, Maina R. Effect of ICT deployment on the Operational performance of Kenya Revenue Authority. *Journal of Strategic Management*. 2017;2(1):19-35.
  49. Martin K, Marcel A. Corporate governance and firms financial performance in the United Kingdom. *International Journal of Financial and Economics*. 2020;26(2):1871-1885.
  50. Metalia M, Suhendro S. Factors Affecting the Financial Performance of Local Government Antecedents in Indonesia. *International Business and Accounting Research Journal*. 2021;6(1):15-23.
  51. Mudasir MK, Firdoos AW, Syed MS. Impact of ICT on Effective Financial Management. *International Journal of Information Science and System*. 2015;4(1):1-14.
  52. Muhamad AA, Ety M, Sekar M, Susi DM. Factors Influencing Financial Performance of the Government. *Academy of Accounting and Financial Studies Journal*. 2021;25(3):1528-2635.
  53. Murata K, Katayam H. An evaluation of factory performance utilized KPI/KAI with data envelopment analysis. *Journal of the Operations Research Society of Japan*. 2009;52(2):204-220.
  54. Ncube M, Vacu N. Managing financial distress in South African local government sector. *Policy Briefing, Fiscal Financial Commission of South Africa*. 2014:45-58.
  55. O'Brein JA, Marakas GM. Enterprise information system. New York: MCGraw Hill; 2010:78-82.
  56. Oktalina G. Analysis of Regional Financial Performance through the Independence Ratio, Effectiveness Ratio, and Growth Ratio in the District South Bangka. *International Journal of Finance Research*. 2020;1(2):60-73.
  57. Pavlshyn Z. Structural and functional analysis of the use of Information Technologies and System in Public Administration. *Efekhyvnist Derzhavnoho upravlinnya*. 2016;3(48):162-166.
  58. Piotr M, Bartosz K. Non-commercial goals and financial performance of state-owned enterprises – some evidence from the electricity sector in the EU countries. *Journal of Comparative Economics*. 2021;49(4):56-64.
  59. Preece LJ. Technological change and organization action. London: Routledge; 2003:15-26.
  60. PricewaterhouseCoopers. National Financial Sustainability Study of Local Government: Commissioned by the Australian Local Government Association. Sydney, NSW: LGA; 2006:28-38.
  61. Regita O, Satria YW, Ermawati. Factors Affecting the Local Governments Financial Performance. *Journal of Economics and Behavioral Studies*. 2020;12(4):84-89.
  62. Rotimi O, Olusola IE, Olusegun EA, Oluwayemisi AMB, Rildwan OB, Rahmon TA, Gbenga AC. Public



- Financial Management tools and performance in Nigeria public Sector. *Academy of Accounting and Financial Studies Journal*. 2021;25(4):1-15.
63. Sari RP, Turino T. Analysis of Financial Performance in Public Sector. *Journal of Accounting and Strategic Finance*. 2018;1(1):82-90.
64. Sebastian J. Understanding the revenue productivity of value added tax. *IUP Journal of Public Finance*. 2011;9(4):28.
65. Spanos YE, Prastacos G, Poulymenakou A. The relationship between information and communication technologies adoption and management. *Information and Management*. 2002;39(8):659-675.
66. Udo OG, Nkannor YS. Effect of Electronically internally generated revenue on infrastructural development of Ebonyi State. *Accounting Research*. 2016;7(2):22-38.
67. UGE ME. Effect of information Communication Technology (ICT) on Financial Performance of Listed Insurance Firms in Nigeria. 2023;3(1):402-414.

#### **Creative Commons (CC) License**

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.