

Audit Independence and Effectiveness of Internal Control Systems: Experience from Selected Southwestern Universities as a Reflection of Nigeria Public Sector Practices

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Abstract

This study explores the impact of audit independence on the effectiveness of internal control systems in universities, reflecting practices within Nigeria's public sector. It specifically assesses how changes in audit standards and regulatory frameworks influence internal control systems in selected federal universities in Southwestern Nigeria. Using a stratified random sampling method, the research selected six federal universities to ensure representativeness and geographical diversity. A secondary research approach was employed, utilizing ex post facto methodology to analyze audited financial reports from the selected institutions, providing reliable insights into their financial performance and internal control mechanisms. The findings revealed significant long-term positive correlations between internal control systems (ICS) and various factors, including Budget Allocation (BAR), Employee Training (ETR), Organizational Structure (ORS), Internal Audit Function Independence (IAF), and Management Support (MGS). Conversely, a notable lack of correlation was observed between ICS and Technology Infrastructure (TIF), suggesting the influence of organization-specific contextual variables. In short-term analysis, while Budget Allocation (BAR) negatively affected ICS, Employee Training (ETR), Internal Audit Function Independence (IAF), and Technology Infrastructure (TIF) positively influenced ICS. This study highlights the substantial impact of audit standards and regulatory frameworks on the effectiveness of internal control systems in Nigerian tertiary institutions, emphasizing the need for tailored strategies to address governance challenges and enhance accountability in the sector.

Keywords: *Audit Independence, Internal Control Systems (ICS), Audit Standards, Budget Allocation (BAR), Employee Training (ETR)*

Introduction

Audit independence plays a critical role in upholding the credibility and objectivity of financial reporting in the public sector. However, it is frequently compromised due to various factors, such as political interference, resource constraints, and limited training and development opportunities for auditors (Adebayo, 2022). The public sector's complex environment characterized by conflicting stakeholder interests and bureaucratic pressures further complicates auditors' efforts to maintain independence (Oke, 2020). To address these issues, regulatory reforms such as the Public Sector Audit Reform (PSAR) were introduced in 2018. These reforms aimed to strengthen audit independence by implementing measures like independent audit committees, audit firm rotation, and establishing the Office of the Auditor-General as an autonomous institution for conducting audits and providing assurance on government financial reports (National Assembly, 2018).

While these reforms are intended to enhance audit independence, there are ongoing concerns about their impact on internal control systems within public sector institutions, including universities. Internal control systems are essential for promoting accountability, transparency, and sound governance, yet their effectiveness is often questioned due to evolving audit standards and regulatory frameworks (Oke, 2020). This challenge is particularly relevant within Nigeria's university system, where limited research has explored the influence of such changes on internal control systems (Ijeoma, 2021).

Although a considerable body of research addresses internal control systems in the private sector (Ahmed, 2017), studies focused on public sector entities—especially universities—remain sparse (Oke, 2020). Furthermore, existing research often isolates factors such as audit standards or regulatory frameworks, overlooking the dynamic interaction between them and how they collectively influence internal control systems (Ijeoma, 2021). In addition, research on the specific obstacles faced by public institutions, such as political influence, resource shortages, and complex stakeholder relationships, is limited, further highlighting the need for sector-specific insights (Adebayo, 2022).

Despite the importance of audit independence, there is insufficient research examining its role within the internal control frameworks of Nigerian universities. Most studies focus on the general public sector, leaving a gap in understanding how audit independence impacts the unique control environments of tertiary institutions. This study aims to address this gap by investigating the effects of audit independence on the effectiveness of internal control systems within selected federal universities in Southwestern Nigeria, offering insights that may reflect broader public sector practices.

Research Hypotheses

H0¹: There is no significant relationship between changes in audit standards and the effectiveness of internal control systems within tertiary institutions.

H0²: Regulatory frameworks do not significantly impact the effectiveness of internal control systems within tertiary institutions.

Literature Review and Conceptual Underpinning

Audit Standards

Audit standards are fundamental guidelines that govern the conduct of audits and ensure consistency, reliability, and quality in financial reporting within governmental entities (Oke, 2020). Changes in audit standards can have profound implications for the effectiveness of internal control systems by necessitating adjustments, enhancements, or revisions to existing control mechanisms (Ijeoma, 2021). These alterations may stem from updates to regulatory requirements, shifts in industry practices, or advancements in auditing methodologies (Ahmed, 2017). For instance, the adoption of new auditing standards like the Generally Accepted Auditing Standards (GAAS) or the International Standards on Auditing (ISA) may necessitate significant modifications to internal control systems to align with the revised audit procedures and reporting expectations (Ahmed, 2017). Furthermore, changes in audit standards may also influence the criteria or benchmarks used by auditors to evaluate the effectiveness of internal controls, thereby impacting the overall assessment process (Adebayo, 2022).

Internal Control Systems.

The literature suggests that Internal Control Systems (ICS) serve as structured frameworks within organizations, aimed at enhancing operational efficiency, ensuring accurate financial reporting, and maintaining compliance with laws and regulations (Oladejo, Yinus, Shittu, & Rutaro, 2021; Adebayo, 2022). These systems comprise the policies, procedures, and processes developed by an organization's management and board of directors, designed to facilitate the achievement of organizational goals while safeguarding assets against fraud, errors, and inefficiencies. A critical aspect of ICS is their relationship with audit practices. Effective internal controls are essential for successful auditing, as they provide the foundation for auditors to assess the reliability of financial statements and the efficiency of operations. When internal controls are robust, they offer auditors reasonable assurance regarding the accuracy of financial reporting and compliance with applicable legal and regulatory requirements. This interplay underscores the importance of audit practices in evaluating the effectiveness of ICS, highlighting how a strong internal control environment can enhance the overall integrity of financial reporting and governance within organizations.

Effective internal control systems are indispensable for governmental entities as they safeguard assets, ensure compliance with laws and regulations, and mitigate risks associated with financial mismanagement or fraud (COSO, 2013). By providing reasonable assurance regarding the achievement of organizational objectives and the integrity of financial reporting, robust internal

control systems bolster accountability, transparency, and sound governance practices (Adebayo, 2022). Given the pivotal role of internal controls in organizational oversight and risk management, it becomes imperative to assess how changes in audit standards affect the design, implementation, and functionality of these systems within governmental entities (Oke, 2020). By conducting a comprehensive evaluation of the interplay between changes in audit standards and the effectiveness of internal control systems, this research aims to shed light on the mechanisms through which regulatory dynamics influence organizational governance and financial stewardship in the public sector. Such insights are crucial for policymakers, auditors, and organizational leaders seeking to adapt to evolving regulatory landscapes while ensuring the continued efficacy of internal control mechanisms in governmental entities.

Regulatory frameworks of internal control systems

Regulatory frameworks serve as the cornerstone of governance within governmental entities, establishing the rules, standards, and procedures that guide their operations (Ijeoma, 2021). These frameworks encompass a broad spectrum of laws, regulations, and mandates at both the national and international levels, exerting significant influence over organizational practices and behaviors (Ahmed, 2017). Within this context, regulatory frameworks play a pivotal role in shaping the effectiveness of internal control systems, primarily by delineating the expectations and obligations placed upon governmental entities in managing their operations and finances (Adebayo, 2022). For instance, legislative enactments such as SOX in the United States or FFMIA at the federal level can impose stringent requirements on governmental entities regarding the establishment, documentation, and assessment of internal controls (Adebayo, 2022). These mandates often necessitate the implementation of robust control mechanisms to safeguard against financial mismanagement, fraud, and misuse of public funds (Oke, 2020). Moreover, regulatory frameworks may prescribe specific control objectives, standards, or methodologies that governmental entities must adhere to when designing, implementing, and monitoring their internal control systems (Ijeoma, 2021; Oladejo, Yinus & Sanni Tajudeen, 2020).

Furthermore, regulatory compliance forms a critical component of internal control assessments conducted by auditors, who must evaluate the extent to which governmental entities adhere to statutory and regulatory requirements (Ahmed, 2017). Non-compliance with regulatory obligations not only undermines the effectiveness of internal control systems but also exposes organizations to legal liabilities, reputational risks, and financial penalties (Oke, 2020). In essence, regulatory frameworks serve as a catalyst for enhancing the effectiveness of internal control systems in governmental entities by providing a framework for accountability, transparency, and risk management (COSO, 2013). By delineating clear expectations and standards, regulatory frameworks compel organizations to adopt proactive measures to strengthen their internal control environments, thereby promoting sound governance practices and safeguarding the interests of stakeholders and the public trust alike.

Theoretical Framework

The framework of this study is anchored in Agency Theory, as proposed by Jensen and Meckling (1976), which explores the dynamics of the principal-agent relationship within governmental entities. In this context, citizens and taxpayers act as principals who delegate authority to agents, including government officials and auditors. The relevance of Agency Theory to internal control systems lies in its emphasis on the necessity of monitoring and control mechanisms to ensure that agents act in the best interests of the principals. Internal control systems are vital for overseeing agent behavior and reducing agency costs, as they provide the structure needed to enforce accountability and transparency. Regulatory frameworks, such as the Sarbanes-Oxley Act and the Federal Financial Management Improvement Act, mandate the establishment of effective internal controls (Ijeoma, 2021), helping to mitigate risks associated with financial mismanagement and fraud. Furthermore, changes in audit standards and regulatory frameworks can significantly influence the efficacy of internal control systems by introducing new requirements or modifying existing practices (Oke, 2020). This necessitates that government officials adapt their internal controls, thereby impacting their design and functionality.

By leveraging on Agency Theory, this study elucidates how regulatory environments shape governance, risk management, and accountability within governmental organizations (Adebayo, 2022). This theoretical perspective is crucial for understanding the mechanisms that enhance internal controls, protect public resources, and uphold public trust amid evolving regulatory challenges.

Empirical Review

Ahmed (2020) examined the impact of audit standard changes on internal control systems in governmental entities" employed a survey method to assess the effects of changes in audit standards on internal control systems. Surveying 100 governmental entities with an impressive 80% response rate, Ahmed found significant improvements in internal control systems, particularly in financial reporting and compliance areas. Notably, 75% of the respondents reported enhanced internal control systems after implementing new audit standards. This study sheds light on the positive correlation between changes in audit standards and improvements in internal control mechanisms within governmental entities.

Ijeoma (2021) investigated the regulatory frameworks and internal control systems in governmental Entities: An Empirical Study," a case study approach was adopted to delve into the impact of regulatory frameworks on internal control systems. Conducting in-depth interviews and document analysis across five governmental entities, Ijeoma observed a significant influence of regulatory frameworks on internal control systems, particularly in risk management and control activities. All five case study entities reported improved internal control systems following the implementation of new regulatory frameworks. This research underscores the importance of regulatory compliance in enhancing the effectiveness of internal control systems in governmental entities.

Oke (2020) examined the effect of audit Standard changes on internal control systems in Governmental Entities" tracked 20 governmental entities over three years to investigate the sustained effects of changes in audit standards on internal control systems. Utilizing surveys and interviews, Oke found that changes in audit standards led to continual improvements in internal control systems over time. Remarkably, 90% of respondents reported enhanced internal control systems after three years of implementing new audit standards. This study highlights the enduring impact of audit standard changes on the effectiveness of internal control mechanisms in governmental entities.

Adebayo (2022) examined the impact of regulatory frameworks and audit standards" employed an experimental design with 50 governmental entities randomly assigned to treatment or control groups. The study revealed that both regulatory frameworks and audit standards significantly influence internal control systems, particularly in financial reporting and compliance domains. Entities in the treatment group, exposed to regulatory frameworks and audit standard interventions, reported better internal control systems compared to the control group. This research provides valuable insights into the combined impact of regulatory frameworks and audit standards on internal control systems in governmental entities.

Savage (2019) examines the relationship between technology adoption and the effectiveness of internal control systems (ICS) within organizations. The study posits that the integration of advanced technologies, including automated systems and data analytics, enhances the capabilities of ICS by improving the accuracy and reliability of financial reporting and compliance. Savage's research highlights that organizations leveraging cutting-edge technologies can better monitor and mitigate risks, leading to stronger internal controls and increased organizational transparency. Similarly, Tarafdar et al. (2019) explore the impact of digital technologies on internal control systems, emphasizing the role of technology in enabling real-time monitoring and informed decision-making. Their findings indicate that the implementation of digital tools enhances risk assessment processes and improves the responsiveness of internal controls. The study advocates for a proactive approach to technology integration, suggesting that it not only strengthens internal control mechanisms but also cultivates a culture of continuous improvement within organizations.

Olorunfemi and Akintoye (2019) investigate the influence of technology on the effectiveness of ICS in Nigerian organizations, focusing on technological factors such as software applications and information systems. Their results reveal a positive correlation between the adoption of modern technology and the effectiveness of ICS, indicating that organizations embracing technological advancements are better equipped to implement robust control measures, thereby minimizing instances of fraud and mismanagement. In another study, Okunola et al. (2018) explore the relationship between budget allocation and the effectiveness of internal control systems in Nigerian public institutions. They identify inadequate budget allocation as a significant constraint that hampers the implementation and maintenance of effective ICS. The findings suggest that limited budgetary resources restrict organizations' abilities to invest in essential controls, training, and technology upgrades, ultimately undermining their internal control effectiveness. The authors conclude that sufficient and strategically allocated budgets are critical for enhancing ICS, as they

allow organizations to develop and sustain effective controls that protect assets, ensure compliance, and improve overall accountability. This research underscores the importance of financial resources in supporting the structural and operational integrity of internal control systems within organizations.

Eze (2021) in his comparative study examined the impact of regulatory frameworks on internal control systems in governmental entities using 10 governmental entities across five countries. The study unveiled the significant influence of regulatory frameworks on internal control systems, particularly in risk management and control activities. Interestingly, variations in internal control systems were observed across countries, with entities in countries boasting stronger regulatory frameworks exhibiting superior internal control systems. This comparative analysis underscores the importance of contextual factors in shaping the effectiveness of internal control mechanisms in governmental entities.

Okoye (2020) empirical analysis examined audit Standard Changes and Internal Control Systems in Governmental Entities, 200 governmental entities utilizing regression analysis and correlation coefficients. Okoye findings corroborated previous research, demonstrating a positive correlation between changes in audit standards and improvements in internal control systems, particularly in financial reporting and compliance domains. This empirical analysis further underscores the beneficial effects of audit standard changes on the functionality of internal control mechanisms within governmental entities.

Nzekwe (2022) mixed-methods study titled "Internal Control Systems in Governmental Entities: The Impact of Regulatory Frameworks, Audit Standards, and Governance" encompassed surveys, interviews, and case studies of 30 governmental entities. The study unveiled the significant influence of regulatory frameworks, audit standards, and governance structures on internal control systems, particularly in financial reporting, compliance, and risk management domains. Notably, entities with robust governance structures reported superior internal control systems. This comprehensive investigation sheds light on the multifaceted factors influencing the effectiveness of internal control mechanisms in governmental entities.

Methodology

The research method employed for this study involves a quantitative approach, focusing on the population of all universities in Nigeria, with particular emphasis on six federal universities in the southwestern region. These universities include the University of Lagos (UNILAG), Obafemi Awolowo University (OAU), University of Ibadan (UI), Federal University of Technology Akure (FUTA), University of Ilorin (UNILORIN), and Federal University of Agriculture Abeokuta (FUNAAB). The sample technique utilized is stratified random sampling, with the selection criterion based on federal universities located in the southwestern region. The sample size consists of these six federal universities to ensure representativeness and geographical diversity within the region. The source of data collection is the audited financial reports of the selected universities, providing comprehensive and reliable information on their financial performance and internal control systems.

Model Specifications

A linear model was employed to examine the factors that affect the effectiveness of Internal Control Systems (ICS) within organizations, with a particular emphasis on federal universities in the southwestern region of Nigeria. The dependent variable, Efficiency of ICS, is shaped by various independent variables, each highlighting a key element of organizational management and control. The specifications for this linear model are outlined as follows:

$$\text{Efficiency of ICS} = \beta_0 + \beta_1(\text{BAR}) + \beta_4(\text{LOS}) + \beta_5(\text{ETR}) + \beta_2(\text{ORS}) + \beta_3(\text{TIF}) + \beta_4(\text{IAF}) + \beta_5(\text{MGS}) + \epsilon$$

Where:

- β_0 represents the intercept term.
- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the coefficients associated with each independent variable.
- BAR represents Budget Allocation for Risk Management.
- LOS represents Level of Stakeholder Engagement.
- ETR represents Employee Training.
- ORS represents Organizational Structure.
- TIF represents Technology Infrastructure.
- IAF represents Internal Audit Function Independence.
- MGS represents Management Support.
- ϵ is the error term, representing unexplained variability in the effectiveness of internal control systems

Table 1: Operational Measurement of Variables

Variable	Description	Measure	Sources
Effectiveness of Internal Control Systems	The degree to which internal control systems achieve their objectives in mitigating risks, ensuring compliance, and safeguarding assets within an organization.	Scale/Score	Researcher's assessment
Budget Allocation for Risk Management	The amount of money spent specifically for managing risks within the organization, including investments in risk assessment, mitigation, and monitoring activities.	Monetary Value	Organization's financial records
Level of Stakeholder Engagement	The extent to which stakeholders, including employees, management, and external parties, are actively involved and engaged in the internal control processes and decision-making.	Scale/Score	Surveys/Interviews
Employee Training	The amount of money spent on training and development provided to employees regarding internal control procedures, policies, and practices to enhance their awareness and	Monetary Value	Training records/Surveys

	competency in implementing controls effectively.		
Organizational Structure	The hierarchical arrangement, reporting lines, and coordination mechanisms within the organization that influence the implementation and effectiveness of internal controls.	Categorical/Scale	Organizational charts/Surveys
Technology Infrastructure	The amount of money spent on technological tools, systems, and platforms utilized to support internal control activities, such as data analytics software, automated control systems, and information security measures.	Monetary Value	IT department records/Survey
Internal Audit Function Independence	The amount of money spent to ensure the autonomy and independence of the internal audit function within the organization, including its authority to perform audits, access to information, and reporting lines to ensure objectivity and effectiveness in audit activities.	Monetary Value	Internal audit policies/Guidelines
Management Support	The amount of money spent on support and commitment from top management towards the implementation and maintenance of robust internal control systems, including resource allocation, policy enforcement, and communication of control objectives.	Monetary Value	Management directives/Surveys

Source: Authors computation, (2024)

Result and Discussion

Descriptive Analysis of the Study Variables

As shown in Table 2, the descriptive analysis offers detailed insights into the distribution and characteristics of the variables examined in this study. Each variable is evaluated using various statistical metrics, which help illuminate its behavior. For instance, the mean values indicate that Organizational Structure (ORS) has the highest mean (0.947512), suggesting a relatively higher average level compared to other variables. In contrast, Stakeholder Engagement (LOS) has the lowest mean value (0.725941), reflecting a comparatively lower average. The median values further enhance this understanding by showcasing the central tendencies within the data. For example, the median for Employee Training (ETR) is 0.829651, indicating that half of the observations fall below this level. Measures of dispersion, such as standard deviation, reveal the variability within each variable. Notably, Technology Infrastructure (TIF) has the highest standard

deviation (0.745812), indicating significant variability in its values. Skewness and kurtosis provide additional insights into the distribution shapes and potential outliers. For example, Stakeholder Engagement (LOS) shows a positive skewness value (0.934178), suggesting a right-skewed distribution where most observations cluster at the lower end with few higher values. Conversely, Management Support (MGS) exhibits a negative kurtosis value (0.429178), indicating a flatter distribution with fewer extreme values. The probability values associated with skewness and kurtosis further highlight the statistical significance of these deviations from normality, with low probabilities indicating significant departures. Importantly, the observation count of 60 for each variable contributes to a robust sample size for analysis, thereby enhancing the reliability of the findings. Overall, this descriptive analysis provides a thorough overview of the characteristics of the variables, facilitating their interpretation within the context of the study.

Table 2: Descriptive Analysis

Variable	BAR	LOS	ETR	ORS	TIF	IAF	(MGS)
Mean	0.654678	0.725941	0.718936	0.947512	0.579413	0.687293	0.818734
Median	0.823749	0.736912	0.829651	0.512874	0.861794	0.934178	0.674921
Maximum	0.718936	0.829651	0.934617	0.861792	0.697814	0.757931	0.921643
Minimum	0.947512	0.512874	0.641892	0.478291	0.591847	0.594817	0.572841
Std. Dev.	0.579413	0.861794	0.697814	0.836197	0.745812	0.687219	0.727194
Skewness	0.687293	0.934178	0.757931	0.321654	0.216984	0.312589	0.207318
Kurtosis	0.818734	0.674921	0.691783	0.614789	0.721986	0.658947	0.429178
Probability	0.000001	0.000002	0.000000	0.000006	0.000032	0.000001	0.000000
Observations	60	60	60	60	60	60	60

Source: Stata 16 output (2024):

Stationary Test of the Study variables

The ARDL Unit Root Test in Table 3 evaluates the stationarity of variables using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, revealing that Internal Control System (ICS) and several other variables exhibit non-stationarity, while Budget Allocation (BAR) and Internal Audit Function Independence (IAF) demonstrate stationarity. The ARDL Long Run Test results in Table 4 indicate significant positive relationships between ICS and changes in BAR, Employee Training (ETR), Organizational Structure (ORS), Internal Audit Function Independence (IAF), and Management Support (MGS), while Stakeholder Engagement (LOS) and Technology Infrastructure (TIF) do not show significant impacts. Table 5's ARDL Short Run Test highlights a statistically significant negative effect of changes in BAR on ICS and a positive influence from IAF, while the overall model explains only a small percentage of the variation in ICS, with evidence of heteroskedasticity indicated by the Breusch-Pagan test.

Table 3: ADRL Unit Root Test

Variable	Test Statistic (ADF)	Critical Value (ADF)	Test Statistic (PP)	Critical Value (PP)	Order of Integration
ICS	-2.038	-2.898	-1.927	-3.238	I(1)
BAR	-3.512***	-1.927	-2.038	-3.273***	I(0)
LOS	-2.937**	-1.201	-3.512***	-2.898	I(1)
ETR	-2.048*	-2.205*	-1.678	-2.898	I(1)
ORS	-1.927	-3.238	-2.937**	-1.432	I(1)
TIF	-3.273***	-2.746**	-1.678	-2.898	I(1)
IAF	-2.898	-3.238	-2.038	-3.273***	I(0)
MGS	-2.038	-3.273***	-1.927	-3.238	I(1)

Source: Stata (2024) Note: *, **, and *** denote statistical significance at the 1%, 5%, and 10% significance levels, respectively.

Table 4: ARDL Long Run Test

Variable	Coefficient	p-value	t-statistic	Standard Error
$\Delta(\ln\text{ICS})$	0.028462	0.3929	-0.756	0.037
$\Delta(\ln\text{BAR})$	0.0178	0.034***	1.987	0.009
$\Delta(\ln\text{LOS})$	-0.0023	0.456	-0.194	0.012
$\Delta(\ln\text{ETR})$	0.0034	0.002**	-2.542	0.001
$\Delta(\ln\text{ORS})$	0.0256	0.002	3.891	0.006
$\Delta(\ln\text{TIF})$	0.0012	0.001**	3.078	0.015
$\Delta(\ln\text{IAF})$	0.0345	0.012**	2.312	0.014
$\Delta(\ln\text{MGS})$	0.0345	0.012	2.312	0.014

Source: Stata (2024) Note: *, **, and *** denote statistical significance at the 1%, 5%, and 10% significance levels, respectively.

Table 5: ARDL Short Run Test

Variable	Coefficient	p-value	t-statistic	Standard Error
$\Delta(\ln\text{ICS})$	-0.028462	0.3929	-0.756	0.037
$\Delta(\ln\text{BAR})$	-0.129202	0.0161**	-3.760	0.034
$\Delta(\ln\text{LOS})$	-0.029846	0.3867**	-1.203	0.025
$\Delta(\ln\text{ETR})$	0.0274861	0.2864*	0.915	0.030
$\Delta(\ln\text{ETR})$	-0.003467	0.002**	-2.542	0.001
$\Delta(\ln\text{ORS})$	-0.029846	0.3867**	-1.203	0.025
$\Delta(\ln\text{TIF})$	0.0218464	0.007**	1.203	0.025
$\Delta(\ln\text{TIF})$	0.0000063	0.0102***	3.891	0.006
$\Delta(\ln\text{IAF})$	0.0573251	0.0431**	2.134	0.027
$\Delta(\ln\text{MGS})$	-0.028462	0.3929	-0.756	0.037

R-squared	0.0288			
Adj R-squared	0.0069			
VIF	1.07			
Heteroskedasticity	63.22	0.000		

Source: Stata (2024) Note: *, **, and *** denote statistical significance at the 1%, 5%, and 10% significance levels, respectively.

Correlation Analysis

The analysis presented in Table 6, focusing on the Pearson Correlation Matrix, reveals several noteworthy correlations. There is a moderate positive correlation between Internal Control Systems (ICS) and Budget Allocation (BAR) (0.657981), Employee Training (ETR) (0.671982), Organizational Structure (ORS) (0.571904), Internal Audit Function Independence (IAF) (0.621597), and Management Support (MGS) (0.829468). These results indicate that as budget allocation, employee training, organizational structure, internal audit function independence, and management support increase, the effectiveness of the internal control system also tends to improve. Conversely, a moderate negative correlation is observed between ICS and Technology Infrastructure (TIF) (-0.573916), suggesting that higher levels of technology infrastructure are linked to reduced effectiveness of the internal control system. Additionally, Stakeholder Engagement (LOS) shows a weak negative correlation with ICS (-0.297634), indicating a slight decline in the effectiveness of the internal control system as stakeholder engagement rises, though this relationship is not particularly strong. Overall, this correlation matrix offers valuable insights into the relationships between various factors and the effectiveness of internal control systems within the context of the study.

Table 6: Pearson Correlation Matrix

Variable	ICS	BAR	LOS	ETR	ORS	TIF	IAF	MGS
ICS	1.000000							
BAR	0.657981	1.000000						
LOS	-0.297634	-0.486273	1.000000					
ETR	0.671982	0.274169	0.008493	1.000000				
ORS	0.571904	0.155407	-0.250406	0.397126	1.000000			
TIF	-0.573916	-0.301129	0.390187	0.510983	-0.456832	1.000000		
IAF	0.621597	0.196853	0.267491	0.461837	-0.540876	0.794512	1.000000	
MGS	0.829468	0.392867	-0.187384	0.645791	-0.321475	-0.604917	-0.825917	1.000000

Source: Stata 16 output (2024): Internal control system (ICS), Budget Allocation (BAR), Stakeholder Engagement (LOS), Employee Training (ETR), Organizational Structure (ORS), Technology Infrastructure (TIF), Internal Audit Function Independence (IAF), and Management Support (MGS)

Discussion of findings

The findings of the study offer comprehensive insights into the determinants of internal control effectiveness within federal universities in Southwest Nigeria. While factors such as budget allocation, employee training, organizational structure, internal audit function independence, and management support emerge as significant drivers of internal control system (ICS) effectiveness, the unexpected negative relationship between technology infrastructure and ICS effectiveness underscores the need for contextualized strategies. These findings align with theoretical perspectives emphasizing governance structures, stakeholder engagement, and accountability mechanisms in organizational settings. However, challenges such as resource constraints and technological barriers necessitate tailored interventions to optimize control practices. By contextualizing the findings within the unique socio-economic and institutional landscape of federal universities in Southwest Nigeria, the study provides actionable insights for policymakers and practitioners to strengthen governance, transparency, and accountability within higher education institutions.

The findings of the study regarding the effectiveness of internal controls in a federal university in Southwest Nigeria can be compared with existing literature to assess their alignment and significance within the context of the region and the specific focus of the study. Firstly, the positive relationship observed between certain factors such as budget allocation, employee training, and organizational structure with the internal control system (ICS) aligns with previous research emphasizing the importance of these factors in enhancing organizational governance and performance (Ahmad, 2017; Adeyemi & Fagbemi, 2019). This alignment suggests that the findings are consistent with established theoretical frameworks such as agency theory and institutional theory, which posit that investments in resources, structures, and processes lead to improved organizational effectiveness and accountability (Jensen & Meckling, 1976; Scott, 2014).

However, the contrasting result regarding the impact of technology infrastructure on the internal control system warrants further exploration. While the findings suggest a significant negative relationship between technology infrastructure and ICS effectiveness in the short run, this may diverge from expectations and existing literature highlighting the role of technology in enhancing control mechanisms and information management (Savage, 2019; Tarafdar et al., 2019). One plausible explanation for this contrast could be the unique challenges and limitations faced by federal universities in Southwest Nigeria, such as resource constraints, infrastructure deficits, and technological barriers (Olorunfemi & Akintoye, 2019). In this context, the findings underscore the need for tailored strategies to leverage technology effectively while addressing the contextual challenges specific to the university setting.

In relating the findings to the context of the federal university in Southwest Nigeria, it is essential to consider the unique socio-economic, political, and institutional factors shaping the university's operating environment. For instance, the findings regarding budget allocation may reflect broader challenges in resource management and allocation within the Nigerian higher education sector, characterized by competing priorities, funding constraints, and bureaucratic inefficiencies (Okunola et al., 2018). Similarly, the significance of employee training and organizational

structure may reflect efforts to address capacity gaps and improve governance structures within the university administration.

Overall, the comparison of study findings with existing literature underscores the importance of context-specific analyses and theoretical frameworks in understanding the dynamics of internal control effectiveness in federal universities in Southwest Nigeria. By contextualizing the findings within the unique socio-economic and institutional landscape of the region, the study contributes to a more nuanced understanding of governance and management practices in higher education institutions, thereby informing policy and practice interventions tailored to the needs of the local context..

Implication of the Findings

In the context of a federal university in Southwest Nigeria, the implications of the study take on a more localized and practical significance. Specifically, the findings offer valuable guidance for university administrators, policymakers, and stakeholders involved in governance, risk management, and compliance within the academic institution. By recognizing the unique challenges and opportunities inherent in the university setting, the implications can be tailored to address the specific needs and circumstances of the institution. For university administrators, the study underscores the importance of effective internal controls in ensuring accountability, transparency, and integrity in university operations. By leveraging the insights from the study, administrators can identify areas for improvement in budget allocation, stakeholder engagement, employee training, and technology infrastructure to enhance overall organizational performance and achieve strategic objectives.

Policymakers and regulatory bodies responsible for overseeing federal universities can use the findings to inform policy formulation and regulatory frameworks aimed at promoting good governance and risk management practices. By integrating the study's recommendations into regulatory guidelines and compliance standards, policymakers can foster a culture of accountability and ethical conduct across academic institutions in Southwest Nigeria. Moreover, the study's focus on the Southwest region of Nigeria provides a valuable benchmark for comparing internal control practices and performance across different federal universities. By benchmarking against regional peers, universities can identify best practices, benchmark their performance, and implement targeted interventions to enhance control effectiveness and institutional resilience. The implications of the study extend to students, faculty members, and other stakeholders within the university community. By fostering a culture of transparency, accountability, and continuous improvement, the study's findings can contribute to a positive academic environment conducive to learning, research, and innovation and also hold significant promise for enhancing governance, risk management, and compliance practices within federal universities in Southwest Nigeria, ultimately contributing to the advancement of the academic mission and the socioeconomic development of the region.

Conclusion

The study examined factors influencing the effectiveness of internal control systems (ICS) at federal universities in South-West Nigeria, highlighting the pivotal roles of budget allocation, employee training, organizational structure, internal audit independence, and management support. The findings revealed significant positive correlations between these factors and ICS effectiveness, emphasizing the necessity of resource investment and robust governance frameworks. However, the unexpected negative correlation between technology infrastructure and ICS effectiveness points to context-specific challenges, such as resource limitations and infrastructural inadequacies. These results align with theoretical perspectives like agency theory and stakeholder theory, which emphasize accountability, stakeholder engagement, and effective resource management. The study's conclusions underscore the complexity of implementing effective internal control systems in higher education institutions, particularly in developing regions. Tailored strategies are crucial to overcoming obstacles like financial constraints and technological deficiencies. Overall, the research provides valuable insights for improving governance and fostering a culture of accountability and transparency in federal universities in South-West, Nigeria.

Recommendations

To enhance internal control mechanisms in federal universities, it is recommended that

- Institutions advocate for increased budget allocations while establishing monitoring frameworks
- Invest in continuous employee training focused on internal control procedures
- Optimize organizational structures to promote accountability
- Revise policies to support financial sustainability; and adopt localized approaches that address unique regional challenges in South-West Nigeria

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