

# Enhancing Procurement Integrity: Key Factors Influencing Internal Audit Effectiveness in Tanzania Public Procurement

*Tanzanya Kamu Alımlarında İç Denetim Etkinliğini Artıran Temel Faktörler: Satın Alma Bütünlüğünün Güçlendirilmesi*

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**ABSTRACT**

This paper analyses the effects of internal audit competence, independence, and procedures on internal audit effectiveness in the procurement process in the public sector of Tanzania. The study is quantitative, and data were collected through questionnaires from accounting officers, senior management officers, audit committees, and internal audit units in public sectors. A total of 318 responses were collected. A Partial Least Structural Equation Modelling (PLS-SEM) technique was applied using R-studio to analyse the collected data, assess the model and test hypotheses. The findings revealed that internal audit characteristics procedures, independence and competence influence internal audit effectiveness in procurement. The study findings provide useful insights for policymakers, academics, and internal audit practitioners on the effect of the characteristics of internal audits in improving the effectiveness of internal audits in procurement in Tanzania.

**ÖZET**

**Anahtar Kelimeler:**

Satın Alma,  
İç Denetim,  
Tanzanya,  
Verimlilik

**Jel Kodları:**

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Bu makale, Tanzanya'nın kamu sektöründe iç denetim yeterliliği, bağımsızlık ve prosedürlerinin iç denetim etkinliği üzerindeki etkilerini analiz etmektedir. Çalışma, nicel bir yaklaşımla yürütülmüş olup veriler, kamu sektöründeki muhasebe görevlileri, üst düzey yöneticiler, denetim komiteleri ve iç denetim birimlerinden oluşan çalışanlardan anketler aracılığıyla veriler toplanmıştır. Toplamda 318 yanıt toplanmıştır. Toplanan verileri analiz etmek, modeli değerlendirmek ve hipotezleri test etmek için R-studio kullanılarak Kısmi En Küçük Kareler Yapısal Eşitlik Modellemesi (PLS-SEM) yöntemi uygulanmıştır. Bulgular, iç denetim özelliklerinin prosedürlerinin, bağımsızlığının ve yeterliliğinin iç denetim etkinliğini satın almada etkilediğini ortaya koymuştur. Çalışma bulguları, Tanzanya'da iç denetimlerin özelliklerinin etkisi iç denetimlerin etkinliğini artırılması hakkında politika yapıcılar, akademisyenler ve iç denetim uygulayıcıları için faydalı bilgiler sunmaktadır.

## **1. INTRODUCTION**

The paper analyses the effects of internal audit characteristics (i.e. competence, procedure, and independence) on internal audit effectiveness in the procurement process in Tanzania's public sector. Procurement is a major expenditure financed by public funds in the public sector (IIA, 2021a). This is dominant in most of the government's activities. This is because of the value attached to facilitate and enhance government performance and service delivery to people (Cherotich et al., 2019). Furthermore, the attainment of the country's political, economic, and social objectives is contingent upon strong procurement management (Kihamba & Ntegwa, 2022). An internal audit can offer reassurance regarding an organization's effectiveness in implementing efficient practices to acquire goods, work and services through its plans and programmes (IIA, 2021a). Internal audits have evolved from the traditional role of monitoring internal control and financial compliance to a crucial internal consultancy in firms' risk management function, which is significant in corporate governance, fraud detection, risk assessment, and compliance audits (Alzeban & Gwilliam, 2014; Cohen & Sayag, 2010; Dellai & Omri, 2016; Samagaio & Felício, 2023).

Approximately 70% of the Tanzanian government's expenditure is subjected to procurement but 20% of this expenditure succumbs to clutches of corruption (Kihamba & Ntegwa, 2022). A study revealed that in Tanzania public sector procurement performance faces challenges such as weak internal control, lack of staff capacity, and lack of integrity (Matto, 2017). Moreover, the internal auditing function faces challenges due to limitations in its structure deficiencies in staffing, inadequate funding, and a lack of necessary working facilities (Tulli, 2016). In line with this internal audit units suffer from a lack of government support, resulting in limited staffing, insufficient funding for fulfilling their responsibilities, and lack of independence (Shishiwa & Said, 2020).

It is critical to have a well-established, effective, and independent Internal Audit Unit in place to limit the detrimental impact of malpractice on organizational performance (Mihret et al., 2010). As a result, it is critical to understand the aspects that contribute to internal audit effectiveness in the Tanzanian procurement process. These factors are crucial in ensuring transparency, accountability, and efficiency in procurement activities. The main objective of the study is to examine factors that influence the effectiveness of internal auditing in procurement in Tanzania's public sector. Specifically, the study assesses the internal auditing competence, procedures and independence that influence the effectiveness of procurement activities in the public sector.

The present study contributes to the existing body of knowledge on internal audit characteristics and effectiveness in procurement (Cohen & Sayag, 2010; David, 2022). This study uses cross-sectional data from accounting officers, senior management officers, audit committees, and internal audit units in public sectors in Tanzania (LGAs and MDAs). While previous studies have focused on the influence of different factors on internal audit effectiveness in Tanzania, this study applies a rigorous econometric method of PLS-SEM, which can estimate path coefficients in structural models and model latent constructs even in the presence of non-normality, is ideal for small to medium sample sizes. Additionally, it can be used to understand the complex relationship between internal audit competence, independence, procedures, and effectiveness in the procurement process. The study findings may be useful in addressing malpractices, fraud and corruption which threaten public sector procurement in Tanzania.

The remainder of this paper is organized as follows: The subsequent section provides a review of the literature on internal audit competence, procedure, independence, and effectiveness. Subsequently, the methods, results, and discussion are presented. The paper concludes by presenting findings, contributions, limitations, and suggestions for future research.

## **2. LITERATURE REVIEW**

### **2.1. Theoretical Literature Review**

In previous studies, various theories have been used to investigate the effectiveness of internal audits. The Resource Based Theory (Alkebsi & Aziz, 2017; Alqudah et al., 2019), Transaction Cost Theory (Endaya & Hanefah, 2013), Resource Dependency Theory (Dittenhofer, 2001), Institutional Theory (Endaya & Hanefah, 2013; Karikari et al., 2022), Stewardship Theory (David, 2022), and others are some of these. However, researchers have not agreed on a single theory that explains the effectiveness of internal audits (Endaya & Hanefah, 2013).

The study at hand employs Stewardship Theory and Contingency Theory to explain the effectiveness of internal audits in the procurement process in the Tanzanian public sector. Stewardship Theory seeks to reconcile economic

approaches such as agency theory, which assumes self-serving individuals, with sociological and psychological perspectives that depict individuals as trustworthy and collectivist (Davis et al., 1997). The theory states that individuals within an organization act responsibly and, in the organization's, and its stakeholders' best interests. When it comes to internal audits, the assumption under this theory is that competent auditors possess the necessary skills to perform successful audits, ensure effective resource utilization and safeguard an organization's integrity. Stewardship Theory also emphasizes rigorous and systematic audit procedures aligned with the organization's objectives and values, which provides valuable insights for enhancing the procurement process and overall organizational performance. This theory underscores the significance of independent auditors who act objectively, reducing the influence of management or stakeholders, thus enhancing the credibility and effectiveness of the audit function. Overall, the Stewardship Theory highlights how responsible individuals can promote organizational success and ensure ethical and efficient internal audit practices.

Contrarily, the Contingency Theory postulates that both internal and external factors have an impact on how effectively an organization is managed and led, hence no single standard is sufficient (Fiedler, 1964; Meyer & Rowan, 1977). Internal audits and public procurement are affected by both internal and external factors (Feng, 2022; Gideon, 2015). The Contingency Theory is suitable for understanding how specific factors in the Tanzanian context may influence the effectiveness of internal audits in the procurement process. This theory suggests that there is no one-size-fits-all approach to organizational practices, and the effectiveness of internal audit procedures may depend on the unique characteristics of the procurement environment in Tanzania. Contingency Theory analyses how the regulatory environment, cultural norms, and organizational structure in Tanzania interact with internal audit procedures. This analysis provides insights into how certain audit approaches may be more suitable for a particular type of procurement practice within Tanzania.

## **2.2. Empirical Literature Review**

### **2.2.1. Internal Audit Effectiveness**

Internal audits play a vital role in organizations, encompassing elements such as planning, fieldwork, reporting, and interpersonal relations, which collectively contribute to their effectiveness (Yusof et al., 2019). It is significantly important to both the business sector (Drogalas et al., 2015; Ta & Doan, 2022) and the public sector (David, 2019, 2022), extending its influence to public and private organizations alike (Cohen & Sayag, 2010). By adopting a systematic approach, internal audit enables organizations to assess and enhance the efficiency of their risk management procedures, control processes, and corporate governance, thereby helping to speed up the achievement of organizational objectives (Dellai & Omri, 2016). Internal audit is intended to improve organizational effectiveness and efficiency through constructive criticism, and its role is to drive continuous improvement (Cohen & Sayag, 2010).

Effectiveness is also defined as “the degree (including quality) to which established objectives are achieved” by the Institute of Internal Auditors (IIA) (IIA, 2010). Organizations that perform internal audits are better able to recognize business risks, address system inefficiencies, and promote continuous development, but to retain the internal audit function's credibility, it is crucial to monitor the efficacy and efficiency (IIA, 2021b). The efficacy of internal audit adds value to organizations by ensuring compliance with established procedures, laws, and regulations which also offer opportunities to enhance existing processes (Yee et al., 2008). Important factors influencing internal audit effectiveness in the public sector include management support, audit experience and auditor's knowledge of the business (competence), and audit being free from all sorts of pressure (independence) (David, 2022; Drogalas et al., 2015).

### **2.2.2. Internal Audit Independence**

As emphasised in the International Standards for the Professional Practice (ISPPIA, Standard 1100), internal audit effectiveness is significantly influenced by the independence of internal audit functions (Alzeban & Gwilliam, 2014). According to the ISPPIA, independence is the state of not being subject to any conditions that would make it difficult for the internal audit activity to carry out its duties as required. It is characterized by internal auditors being able to perform their duties objectively and impartially (Stewart & Subramaniam, 2010). The independence of the internal audit unit has a favourable and considerable impact on the overall level of internal audit competency in the Malaysian public sector (Yusof et al., 2019). Additionally, internal audit effectiveness is positively impacted by both internal audit independence and management support for internal audit (Cohen & Sayag, 2010; Ta & Doan, 2022), with internal audit effectiveness in the Malaysian context notably influencing internal audit independence (Tahajuddin & Kertali, 2018). In a similar vein, a study on the elements influencing internal audit effectiveness in Tunisian organisations finds that internal audit independence, internal auditor objectivity, and management support for internal audits play critical roles (Dellai & Omri, 2016). Additionally, it's important to

keep in mind that a lack of internal audit independence makes it difficult to achieve adequate internal audit performance because it results in ineffective organisational performance (Alzeban & Gwilliam, 2014). Consequently, the following is our first hypothesis:

*H<sub>1</sub>: Internal audit independence positively affects internal audit effectiveness in the procurement process.*

### **2.2.3. Internal Audit Competence**

The competence of internal audit staff is crucial for the effectiveness of internal audit activities (Alzeban & Gwilliam, 2014). Internal auditors and internal audit activities must meet the requirements of the International Standards for the Professional Practice of Internal Auditing (ISPPA, Standard 1210) by possessing the necessary knowledge, skills, and competencies. Internal auditors must therefore possess the necessary education, professional credentials, experience, and training (Mihret et al., 2010). A competent internal audit function aims to ensure effective internal controls, contributing to the growth of the economy and the progress of public organizations. Public entities lacking competent internal audit units face significant challenges in achieving their objectives, including economic development and national growth. This highlights the increasing need for competent internal audit functions, particularly in the Tanzanian public sector, with a specific focus on public procurement. Studies stress the significance of internal auditor competency in determining internal audit effectiveness (David, 2019, 2022; Grima et al., 2023). It is important to note that some study findings indicate that the efficiency of an internal audit programme may be restricted by the competency of internal auditors and the calibre of their work (Cohen & Sayag, 2010; Ta & Doan, 2022). Internal audit competencies facilitate the internal audit function to provide relevant and reliable information on public procurement (David, 2022). Therefore, the following is our second hypothesis:

*H<sub>2</sub>: Internal audit competence positively influences internal audit effectiveness in procurement.*

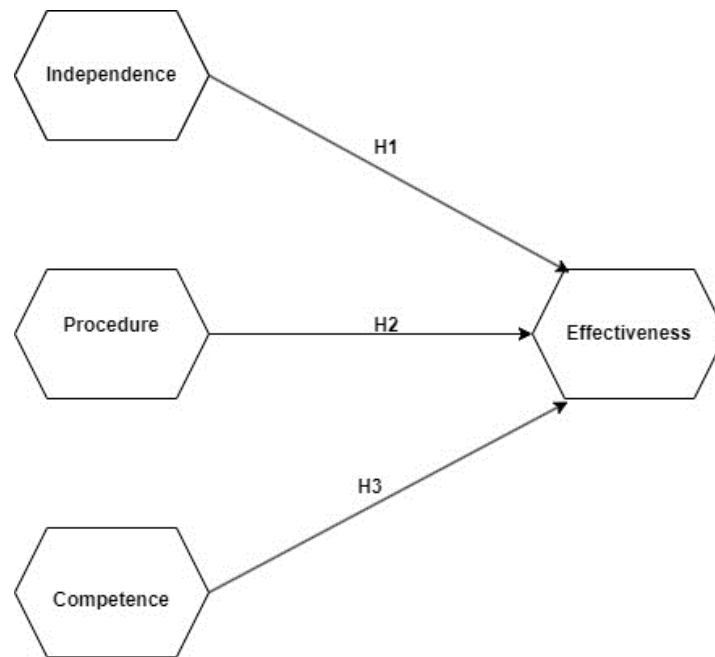
### **2.2.4. Internal Audit Procedures**

Internal audit procedures on public sector procurement are those procedures and methods used by the auditors to obtain the necessary sufficient and appropriate audit evidence to give their assurance on controls in procurement assignments (David, 2019, 2022). For the audit in procurement to be effective, the procurement laws should be understood by auditors and procurement cycles should be at the fingertips of the auditors (URT, 2011). Performing an audit following internal audit standards affects the effectiveness of the internal audit (Cohen & Sayag, 2010; Dejnaronk et al., 2016; Mihret & Yismaw, 2007). To ensure compliance with procurement laws inside an organisation, the internal audit function must have a complete understanding of the procurement cycle.

The procurement cycle comprises essential processes for acquiring goods, services, or works and is a cyclical process. Members can use this interactive tool to be guided through every step of the procurement process and receive relevant information to help them make decisions. Planning for procurement, defining requirements, sourcing for tenders, assessment and selection, contract award, and contract administration are all included in the procurement cycle (URT, 2011). Following the recommended processes and procedures and adhering to procurement policies are essential for internal audits to prevent adverse audit outcomes. Moreover, the internal audit role needs to monitor procurement activities that law enforcement reveals and reports (URT, 2001, 2011). The auditor has to identify and resolve any disparities or abnormalities as soon as possible to guarantee an equitable and transparent procurement procedure (Etse & Asenso-Boakye, 2014).

Additionally, the internal audit procedures can positively influence internal audit competence through clarity and focus, compliance, and standards as well as access to information ensuring there are quality auditors who can execute their duties aligning with public sector regulation, procurement risk assessment, quality of procurement audits as well as preventing fraud and mismanagement. Thus, internal audit procedures ensure transparency, fairness, and compliance with regulations during the procurement process. As a result, our third hypothesis is as follows:

*H<sub>3</sub>: Internal audit procedures positively influence internal audit effectiveness in procurement.*



**Figure 1.** Research Model of the Research.

Unlike previous studies like (David, 2019, 2022) which used only the LGAs sample, the study at hand contributes to the existing body of knowledge on the effectiveness of internal audit effectiveness in procurement in public sectors by employing a representative sample from MDAs and LGAs. Additionally, the study uses a different methodology. Therefore, the study at hand makes an incremental innovation in academic contribution as it uses a different sample and rigorous methodology.

### 3. METHODOLOGY

#### 3.1. Data and Sampling

This study's target consisted of audit department employees in Tanzania's public sector (LGAs and MDAs). From December 10, 2021, to January 3, 2022, self-administered questionnaires were distributed to public officials at Tanzania's Department of Internal Audit. The survey used a convenient sampling technique. 420 questionnaires were distributed in total and 318 of them were returned with complete information (76 per cent response rate) and were used for analysis. Of these valid responses, 241 were from LGAs and 77 were from MDAs. The sample included accounting officers, senior management officers, audit committees, and internal audit units as they were considered to be in the best position to provide appropriate responses on the accuracy of the financial statements and other relevant documents to the audit, including compliance with applicable laws and regulation (URT, 2023).

#### 3.2. Research Instrument

The study included numerous items on a five-point Likert scale to measure the components under consideration. Multiple items, a five-point Likert scale was used in the study to measure the constructs being studied. To ensure the validity of the measurement, previously validated items were drawn from relevant previous studies. However, we conducted new validity and reliability tests since we modified the tool. All measurement items received scores ranging from 1 (strongly disagree) to 5 (strongly agree). Internal audit independence constructs were specifically tested using eight items from Alzeban & Gwilliam (2014) and Turetken et al (2019). The internal audit procedural construct was evaluated using eleven elements from the PPRA Performance and Score Sheet and the IIA Operations Manual. Internal audit competency was assessed using eight items adopted from Alzeban & Gwilliam (2014) Drogalas et al (2015) and Turetken et al (2019), while internal audit effectiveness was measured using four items adopted from Alzeban & Gwilliam (2014) and Cohen & Sayag (2010).

In the pre-test phase, specialists assessed the questionnaire before it was distributed to respondents. Then it was administered to some respondents in a pilot study to identify any necessary changes. Accommodations were made based on the feedback received during this pre-test phase. There were five sections in the final questionnaire. The first section was on the respondents' profiles such as their education level, years of experience in management,

professionalism and whether from LGAs or MDAs. The last four sections focused on internal audit competence, independence, procedure, and effectiveness.

Descriptive statistics for the internal audit effectiveness dimensions are shown in Table 1. The mean scores and standard deviations for each dimension were calculated. For instance, the mean score for "internal audit procedures" was 3.617, with a standard deviation of 0.805. Similar statistics were computed for "internal audit independence" (mean score=3.374, SD=0.775), "internal audit competence" (mean score=3.590 SD=0.767), and "internal audit effectiveness" (mean score=3.519, SD=0.912). It is worth mentioning that all the mean ratings obtained were greater than 3 on a 5-point Likert scale. This indicates the respondents' positive response and agreement on the items related to internal audit competence, independence, procedure, and effectiveness.

### 3.3. Analytical Methods

The PLS-SEM method was used to assess hypotheses based on structural equation modelling for this study. The R software was used for the analysis. PLS-SEM is a well-established technique that is widely used to estimate path coefficients in structural models. Even in the presence of non-normality, it can represent latent constructs and is appropriate for small to medium sample sizes. The loadings, weights, and path coefficients were found to have varying significance levels using the bootstrapping technique. Prior to exploring the structural relationships of the model, the measuring model's validity and goodness of fit were evaluated (Anderson & Gerbing, 1988).

The R-Studio software's PLS-SEM was used to analyse the data. The first section of the analysis concentrated on the evaluation of reflective measurement models. In this study, indicator reliability, internal consistency reliability, convergent validity (AVE) (see Table 3) and discriminant validity (Fornell-Larker and Heterotrait-Monotrait Ratio (HTMT) criteria) were assessed (see Tables 4 & 5). The structural model assessment (path coefficients) was the focus of the second section of the analysis. The initial sample size was bootstrapped using 1,000 resamples to create T-values and path coefficients (Table 7) to test the study's hypotheses. Collinearity, path coefficient, coefficient of determination (R-square), and effect size (f-square) are all used to evaluate the structural model.

**Table 1.** Descriptive Statistics

<b>Constructs</b>	<b>No. of items</b>	<b>Mean score</b>	<b>SD</b>
Competence	8	3.590	0.767
Procedure	11	3.617	0.805
Independence	8	3.374	0.775
Effectiveness	4	3.519	0.912

## 4. RESULTS

### 4.1. Respondent's Profile

The sample for this study included respondents from both Local Government Areas (LGAs) and Ministries, Departments, and Agencies (MDAs) (see Table 2). Seventy-six per cent (76%) of respondents in the sample were from LGAs and 24% were from MDAs. Respondent's profile indicated that 46% of the respondents held a bachelor's degree, 51% had a master's degree, and approximately 4% had a diploma in accountancy. Making informed decisions during the procurement process largely depends on the level of education. The study also recognized the significance of the profession in making informed decisions in procurement. In terms of specific qualifications, only 2.8% of the respondents had a diploma in accountancy. The majority (60%) of the respondents are Procurement/Accountant officers. Certified Public Accountants accounted for 21%, while Certified Procurement and Supplies Professionals comprised 8.8% of the respondents. Meanwhile, lawyers were 7.55% of all the respondents. Thus, the procurement process benefits from these diverse qualifications when making decisions. Additionally, Table 2 shows the respondents' experience in management roles. Approximately 26% of the respondents had 4-6 years of managerial experience, compared to 16% who had less than 3 years. Also, 22% of the respondents had 7 to 10 years of experience. Approximately, 6% and 2%, respectively had experience had experience ranging from 21 to 30 and above 30. Over 50% of the participants had over 7 years of experience in managerial positions.

**Table 2.** Respondent's Characteristics

Variable	Items	(%)
Education level	Diploma in accountancy	3.46
	Bachelor's degree	45.91
	Master's degree	50.63
Years of experience	0-3 years	15.72
	4-6 years	25.79
	7-10 years	21.70
	11-20 years	28.62
	21-30 years	5.97
	Above 30 years	2.20
Profession	Diploma in Accountancy	2.83
	Procurement/Accountant officer	60.06
	Certified Public Accountant	20.75
	Certified Procurement and Supplies Professional	8.81
	Lawyer	7.55
Public sector	Local Government Authority (LGAs)	75.79
	Ministries, Departments and Agencies (MDAs)	24.21
Total		318

#### 4.2. Evaluation of the Measurement Model

Validity and reliability are taken into account when assessing the quality of reflective measurement models computed by PLS-SEM. Evaluation of the measurement model considers assessing the indicator reliability, the internal consistency reliability, the convergent validity and the discriminant validity (Hair et al., 2021). It is recommended to eliminate elements with loadings below 0.40 from the model, which is what we did to make sure the indicators were reliable (Hair et al., 2021). We retained variables with loadings equal to or above 0.40, as removing them did not result in improved internal consistency reliability or convergent validity. It is worth noting that the scale used to measure these variables is a recently developed one, which justifies their retention in our model.

Table 3 reports item outer loadings, the composite reliability ( $\rho_c$ ), Cronbach's alpha (CA), the reliability coefficient ( $Rho-A$ ), and the average variance extracted (AVE). Each of the competencies, procedures, independence, and effectiveness indicator loadings of the reflectively measured construct is above 0.40 (Hair et al., 2019) indicating a sufficient level of indicator reliability. This suggests that the construct accounts for about 40% of the variation of the indicator, hence offering satisfactory indicator reliability in social science (Hulland, 1999).

The exact (or consistent) reliability coefficient (Rho-A), Cronbach's alpha, and composite reliability were used to evaluate the construct and the items' internal consistency reliability. The reliability coefficient for competence, independence, procedure, and effectiveness has all shown greater levels of internal consistency reliability, with respective scores of 0.863, 0.868, 0.933, and 0.859. According to Hair et al. (2019), all construct measures are deemed reliable if Cronbach's alpha (0.847 for competence, 0.929 for procedures, 0.845 for independence, and 0.851 for effectiveness) and the composite reliability (0.883 for competence, 0.940 for procedures, 0.882 for independence, and 0.900 for effectiveness) are higher than the 0.70 thresholds. Table 3's findings demonstrate that the elements satisfy the specified requirements and can be included in the model.

Convergent validity—the extent to which a construct converges to explain the variance of its indicators—was also assessed using average variance extracted (AVE), which is the mean of a construct indicator's squared loadings. The AVE is greater than 0.50, as indicated in Table 3. Given our sample's reliability and validity, this renders the model acceptable.

**Table 3.** Results of Construct Validity and Reliability Tests

Constructs	Items	Loadings	$\rho_c$	CA	Rho-A	AVE
<b>Competence</b>	C1	0.777	0.883	0.847	0.863	0.516
	C2	0.791				
	C3	0.795				
	C4	0.645				
	C5	0.724				
	C6	0.478				
	C7	0.678				
	C8	0.652				
<b>Procedures</b>	P1	0.632	0.940	0.929	0.933	0.590
	P2	0.659				
	P3	0.809				
	P4	0.811				
	P5	0.807				
	P6	0.844				
	P7	0.820				
	P8	0.806				
	P9	0.770				
	P10	0.775				
	P11	0.722				
<b>Independence</b>	I1	0.615	0.882	0.845	0.868	0.671
	I2	0.628				
	I3	0.648				
	I4	0.790				
	I5	0.857				
	I6	0.851				
	I7	0.429				
	I8	0.689				
<b>Effectiveness</b>	E1	0.859	0.900	0.851	0.859	0.693
	E2	0.896				
	E3	0.825				
	E4	0.743				

**Notes:** AVE=Average Variance Extracted;  $\rho_c$ =composite reliability; CA=Cronbach Alpha; Rho\_A= reliability coefficient, See Appendix A1 for explanation of C1,C2,...C8, P1, P2,...,P11, I1, I2,...I8, E1, E2..., E4

#### 4.2.1. Discriminant validity

Two criteria were employed to assess the discriminant validity of the components in this study: the Heterotrait-Monotrait Ratio (HTMT) of the correlations and the Fornell-Larcker criterion. According to the Fornell-Larcker criterion (Fornell & Larcker, 1981), each construct's square root of the average variance extracted (AVE) should exceed its highest correlation with any other construct in the model. Additionally, it is recommended that the HTMT values be below 0.90 for conceptually similar constructs and below 0.85 for different constructs (Hair et al., 2019, 2021). In the analysis based on the Fornell-Lacker criterion, it was observed that the square root value of each construct exceeded its correlations with other constructs. The results of both tests satisfied the recommended thresholds, hence indicating that all constructs in this study had an acceptable discriminant validity (Tables 4 and 5).

**Table 4.** Fornell-Larcker's Discriminant Validity Criterion

	Procedure	Independence	Competence	Effectiveness
Procedure	<b>0.768</b>			
Independence	0.709	<b>0.819</b>		
Competence	0.692	0.700	<b>0.718</b>	
Effectiveness	0.702	0.747	0.701	<b>0.833</b>

**Notes:** AVE's square root is represented by the diagonal values



**Table 5.** The Heterotrait-Monotrait Ratio (HTMT) of the correlations

	Procedure	Independence	Competence
Procedure	.	.	.
Independence	0.748	.	.
Competence	0.531	0.480	.
Effectiveness	0.786	0.808	0.496

Furthermore, we examined if the HTMT value deviated considerably from 0.85 (Henseler et al., 2015). The original HTMT values for each combination of constructs in the model are displayed in Table 6's column Original Est. Together with the average HTMT values estimated from 10,000 bootstrap samples, the original HTMT values are displayed in column Bootstrap Mean. Since every number in the 95% column is below the cutoffs, every HTMT result is substantially lower than 0.85 and 0.90, respectively.

**Table 6.** Bootstrap Confidence Intervals Test

	Original Est.	Bootstrap Mean	Bootstrap SD	T Stat.	5% CI	95% CI
Competence -> Independence	0.480	0.481	0.054	8.953	0.392	0.564
Competence -> Procedure	0.538	0.537	0.049	10.916	0.452	0.615
Competence -> Effectiveness	0.507	0.505	0.054	9.336	0.413	0.590
Independence -> Procedure	0.796	0.797	0.035	22.691	0.735	0.854
Independence -> Effectiveness	0.863	0.863	0.034	25.510	0.806	0.814
Procedure -> Effectiveness	0.786	0.786	0.044	17.751	0.708	0.854

### 4.3. Structural Model and Hypothesis Testing

We assess the validity and reliability of all constructs by evaluating the measurement model before analysing the structural model to determine the significance of the hypotheses. Initially, we examined the model's collinearity by examining each item's variance inflation factor (VIF). The VIF was 2.265 (Procedure), 2.057 (Independence), and 1.311 (Competence). Multicollinearity was not an issue because all the values were below the 5-point threshold.

The significance of the path coefficients was assessed using a bootstrapping method with 1,000 iterations based on t-values and confidence intervals. The results of the hypothesis testing are shown in detail in Table 7. All the hypotheses that were put forth to affect Internal Audit Effectiveness procurement are supported by the findings. Results supported the first hypothesis (*H1*), which postulated that internal audit independence positively affects internal audit effectiveness in the procurement process (*H1*:  $\beta=0.493$ ,  $t=7.954$ ). Additionally, the second hypothesis (*H2*) postulated that internal audit procedure positively affects internal audit effectiveness, and this postulation was supported by the results (*H2*:  $\beta=0.300$ ,  $t=4.382$ ). These results confirmed that internal audit procedures will lead to internal audit effectiveness. Similarly, the third hypothesis (*H3*) postulated that internal audit competence positively affects internal audit effectiveness, which was supported by results (*H3*:  $\beta=0.100$ ,  $t=2.894$ ). These results confirmed that internal audit competence will affect internal audit effectiveness in procurement.

**Table 7.** Hypothesis testing

	Original Est.	Bootstrap Mean	Bootstrap SD	T Stat.	5% CI	95% CI
Competence -> Effectiveness	0.100	0.102	0.034	2.894	0.046	0.159
Independence -> Effectiveness	0.493	0.490	0.062	7.954	0.392	0.594
Procedure -> Effectiveness	0.300	0.303	0.069	4.382	0.188	0.415

### 4.4. Model Explanatory Power

The endogenous construct's coefficient of determination ( $R^2$  value) for effectiveness was 0.623, which is moderate and would be deemed acceptable in this context. Additionally, the  $f^2$  effect size of the predictor shows the value

for all combinations of the corresponding exogenous (i.e. predictor) construct and the corresponding endogenous constructs (represented by columns). The results revealed that the internal audit procedure had a small effect size (0.106) on the effectiveness of internal audits in procurement. In contrast, independence exhibited a medium effect size (0.314) on the effectiveness of internal audits. Lastly, internal audit competence showed a small effect size (0.020) on the effectiveness of internal audits.

**Table 8.** Path Coefficient Estimates,  $R^2$ , Adjusted  $R^2$  Values, and  $F^2$  Effect Sizes

	Effectiveness	$f^2$ (Effectiveness)
$R^2$	0.623	.
Adj $R^2$	0.619	.
Procedure	0.300	0.106 (medium)
Independence	0.493	0.314 (medium)
Competence	0.100	0.20 mall)

## 5. DISCUSSION

This study aimed to investigate the relationship between internal audit effectiveness and characteristics such as independence, competence, and procedures. Thus, the goal was to highlight the impact of internal audit independence, competencies, and procedures on internal audit effectiveness in Tanzania's public sector procurement. The construct was shown to be valid and reliable by the measurement model assessment, and the model itself was deemed acceptable.

The first hypothesis's results showed that internal audit independence and internal audit effectiveness in the procurement process are positively related. Internal audit independence and internal audit effectiveness in procurement by ensuring objectivity in the assessment, identification of risks and issues, credibility and trust, and alignment with professional standards. These results are consistent with results from previous studies (Alzeban & Gwilliam, 2014; Cohen & Sayag, 2010; David, 2022; Ta & Doan, 2022; Yusof et al., 2019). However, independence achieved partial confirmation of their positive influence (Grima et al., 2023). Independence and management support significantly result in improved procurement performance (Yusof et al., 2019). Additionally, the quality of the internal audit function is positively linked to the organizational independence of said function (Cohen & Sayag, 2010).

The findings for hypothesis 2 demonstrated that internal audit effectiveness in procurement is positively influenced by internal audit procedure. Thus, a well-designed internal audit procedure in procurement ensures the quality of the audit, alignment with organization objectives, compliance with standards and access to resources. This is in line with the previous study that found standard adherence to have a positive influence (Grima et al., 2023). However, other studies revealed non-compliance with International Standards on Auditing (ISA) and identified issues such as a lack of independence, outdated technology, and unfavourable attitudes among internal auditors (Shishiwa & Said, 2020).

The results for hypothesis 3 indicated that internal audit competence positively influences internal audit effectiveness in the procurement process. Competent auditors are better equipped to understand and evaluate procurement processes, identify risks, and provide valuable recommendations. Their skills and expertise contribute to the overall impact and value of the internal audit function in supporting improved procurement practices and governance. These results corroborate findings from previous studies (Cohen & Sayag, 2010; David, 2022; Grima et al., 2023). It is different from the study which revealed a non-significant positive relationship between competence and procurement performance (Yussuf et al., 2021).

## 6. CONCLUSION

The current study examined how internal audit effectiveness in the public procurement process is influenced by internal audit competence, procedures, and independence. Internal audit effectiveness in procurement is important in ensuring there is no malpractice and corruption with the public funds in the public sector in Tanzania. The results showed that competence, independence, and internal audit procedures all positively affect how effective internal audit procurement is in Tanzania's public sector. To ensure that internal audit functions are competent, independent, and have well-designed procedures, the government have to make sure that they are given the necessary resources. This is crucial, especially in a nation where a significant portion of public funds are allocated to the procurement of goods, works and services.

Even while the study at hand shed some light on the relationship between internal audit effectiveness and characteristics of public procurement in Tanzania, it was limited to the country's public sector. Thus, its findings cannot be generalized to the private sector in Tanzania. Comparable studies can be conducted in Tanzania's public and private sectors to obtain comparable and generalizable findings. Additionally, this study adopted only three internal audit characteristics (independence, competence, and procedure) in assessing internal audit effectiveness. Therefore, additional internal audit characteristics that could impact the effectiveness of internal audits in procurement might be examined in future studies. Thus, future studies can be carried out on support from management, the role of external audit in promoting value for money (VFM) in public procurement, and objectivity and its effect on internal audit effectiveness.

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#### AUTHORS' DECLARATION

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

#### AUTHORS' CONTRIBUTIONS

Conceptualization, writing-original draft, editing – **JD** and **MN**, data collection, methodology, formal analysis – **JD** and **MN**, Final Approval and Accountability – **JD** and **MN**.

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## APPENDIX

### Appendix 1. Attributes of Variables Used

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#### **Internal Audit competencies on procurement assignments**

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- C1-Internal Auditors possess the qualifications necessary to carry out procurement audits.
- C2-Internal Auditors have the necessary experience to audit procurement assignments.
- C3-Internal Auditors have training on the Procurement Act
- C4-The number of Internal Audit Staff in the organization is adequate
- C5-At least every year Internal Auditors attend training on procurement Audit
- C6-Internal Audit Unit issues audit findings to management at least once in three months.
- C7-Staff attend on-the-job training at least twice a year
- C8-Internal Auditors trained in information technology

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#### **Internal Audit procedures on procurement assignments**

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- P1-Internal Auditors are knowledgeable about the Procurement cycle
- P2-Internal Audit Unit reviews the procurement plan as required by the professional body and PPRA
- P3-Internal Audit Unit reviews user department initiation of the procurement requirements
- P4-Internal Audit Unit reviews the composition of the Tender Board in the organization
- P5-Internal Audit reviews the involvement of the Tender Board on the contracts awarded
- P6-Internal Audit Unit evaluates decisions for the procurement method applied in the acquisition of the specific tender.
- P7-Internal Audit evaluates the work of the evaluation committee for submitted tenders
- P8-Internal Audit Unit reviews how the Evaluation criteria for submitted tenders were developed
- P9-Internal Audit Unit reviews communication of tender awards to suppliers/services providers who are about to win the said tenders
- P10-Internal Audit Unit reviews the conduct of negotiations with bidders before awarding tender
- P11-Internal Audit Unit reviews the formation of the contract management team

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#### **Independence of Internal Audit on Procurement assignments**

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- I1-Internal Auditors are sufficiently removed from political pressure in carrying on an audit assignment
- I2-Internal Audit Unit has free access to documents
- I3-Internal Audit Unit has free access to those charged with Governance
- I4-The council has an Internal Audit Charter
- I5-The Internal Audit charter has clearly defined the responsibilities of internal audit
- I6-The Internal Audit Charter has clearly defined authorities of the Internal Audit Unit
- I7-The Internal Audit unit has its sub-vote
- I8-The Internal Audit unit sub-vote is sufficiently funded

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#### **Effective Procurement Assignments**

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- E1-Organization comply with procurement legislation
  - E2- The organization minimize procurement costs
  - E3- The organization procure the required goods, works and services
  - E4- The organization timely acquire goods, work and services
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