Procurement internal control systems and cost-effectiveness in force account construction projects

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Abstract

Public organisations consistently face challenges in achieving cost-effectiveness in construction projects, and this issue remains a global concern. In response to this issue, the present study examines the role of procurement internal control systems on cost-effectiveness in force account (FA) construction projects in local government authorities (LGAs). A cross-sectional research design with a sample size of 318 respondents from selected LGAs in Dodoma, Tanzania was used. Data were collected using a structured questionnaire and analysed using covariance-based structural equation modelling. The findings revealed that attributes of procurement internal control systems that include stock control ($\beta = 0.165$, $p < 0.015$), record keeping ($\beta = 0.355$, $p < 0.001$), authorisation process ($\beta = 0.233$, $p < 0.002$), have significant and positive relationships with cost-effectiveness in FA construction projects. The study's findings failed to confirm the significant link between the segregation of duties and the cost-effectiveness in FA construction projects ($\beta = 0.094$, $p < 0.095$). These results imply that among the considered procurement internal control systems; segregation of duties does not significantly matter in explaining cost-effectiveness in FA construction projects in LGAs. The study was limited by its geographical context. Therefore, the generalisation of findings should be done with caution because the study relied on the evidence from FA construction projects in primary schools within LGAs in Tanzania. This study provides valuable practical insights for procurement practitioners and members of the FA committee in the public sector. It guides the adherence to the procurement internal control systems to enhance the cost-effectiveness in construction projects.

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1. Introduction

Cost-effectiveness in construction projects is considered a challenge in public organisations. This is normally because of increasing costs compared to the estimated budget due to poor project management, inflation, and the use of poor-quality materials, which leads to reworkings (Beste & Klakegg., 2022; Chadee et al., 2023). Achieving cost-effectiveness is important in the government because the money saved can be used to improve society's welfare, hence leading to increased trust the government (Obi et al.,2021; Sinesilassie, 2019). Force account (FA) procurement approach has been extensively implemented in the public sector in many developing nations, particularly in Africa (Engelbert et al., 2016; Mwaiseje et al., 2024). For example, in Ethiopia, FA procurement is used when the construction projects are small and conducted in a remote area where the possibility of bidders being attracted is very low (Gadisa & Zhou, 2021). In Tanzania, the usage of FA procurement has increased significantly in public organisations, particularly in local government authorities (LGAs), where 80% of construction projects are implemented by using FA approach (PPRA, 2021). FA construction projects involve the use of in-house labour, equipment, and materials by a government agency or organisation to complete construction work (United Republic of Tanzania (URT), 2023). The use of FA in projects allows for the greater flexibility, easy-to-control cost and increased tight eye over the overall construction process.

On the other hand, procurement internal control systems are very important in project management. As they help to prevent fraud and enforce ethical conduct through the establishment of policies, procedures and guidelines (Muhwezi et al., 2023). They consist of different activities which, if they work together, can help to achieve the intended objectives of the organisations. These activities include segregation of duties, which involves assigning tasks to different individuals and working without interfering with each other (Ferrer et al., 2020). Through segregation of duties, it is not possible for any person to manipulate the procurement process for private gain (Chiu & Jans, 2019). The authorisation and approval process enable the organisation to be sure of all transactions and not only helps to avoid any unauthorised

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procurement but also contributes to the achievement of transparency and accountability of the procurement (Nduhura et al., 2022). Stock control is a very important activity in construction projects because it enables the project management team to be aware of the materials available and if the materials need to be replenished (Frontoni et al., 2020; Ochelle, 2017). Poor stock control may lead to stock-outs which increase delays as well as cost the projects due to the increase in unnecessary operation costs (Paul et al., 2021). Record keeping is used to assess organisational performance; therefore, relevant records must be developed, collected, and managed properly (Namukasa, 2017). That is why past research has to it with performance. Matto (2022) found that strong record keeping results in cost savings. In this regard, procurement internal control enhances the overall performance of public procurement.

Achieving cost-effectiveness which is defined as the ability to complete construction projects within the allocated budget while maintaining quality and efficiency, is a critical objective for most organisations. Organisations worldwide struggle to achieve cost-effectiveness in construction projects due to challenges such as poor project management, inadequate planning, and unexpected cost overruns (Albtoush et al., 2020; Chen et al., 2016; Fazil et al., 2021). This issue is particularly noticeable in Africa, where different factors such as economic instability, lack of skilled labour, and inefficient procurement processes further make it difficult in managing costs (Aloyce et al., 2024; Tembo et al.,2024). Tanzania, like other developing countries, experiences difficulties in achieving cost-effectiveness in construction projects (Israel, 2023). PPRA and controller and auditor general (CAG), for example, reported cost overruns in public construction projects in various regions of Tanzania and revealed that the majority of projects' costs sometimes exceeded 70% of their contractual value (National audit office of Tanzania (NAOT), 2021; PPRA, 2021, 2022). Also, in FA construction projects implemented in LGAs, achieving cost-effectiveness was not attractive because 60% of the projects were reported to have inadequate documentation of material costs and expenses exceeding the estimated budget (NAOT, 2019; PPRA, 2021). These inefficiencies indicate weaknesses in oversight and accountability mechanisms, which are central concerns of agency theory. The theory emphasises the principal-agent relationship, where agents are expected to act in the best interests of principals (Jensen & Meckling, 1976). However, in the absence of strong internal controls, information asymmetry and self-interest may result in inefficiencies and misuse of resources. Therefore, the implementation of an effective procurement internal control systems is essential to enhance transparency, accountability, and efficiency in the procurement process, ultimately ensuring the achievement of organisational objectives in construction projects.

Procurement of works constitutes a significant amount of the national budget of Tanzania (Changalima et al., 2021), and it is necessary to make efforts to improve cost-effectiveness in FA construction projects. A number of empirical studies indicate that the success of projects in Tanzania is linked to proper procurement contract management (Matto et al., 2021; Mchopa, 2015) and microeconomic determinants (Makoye et al., 2023). Within a different framework, a body of literature demonstrates a correlation between the inflation rate (Musarat et al., 2021) and corruption (Niazi & Painting, 2017), with the cost performance of construction projects. Scant evidence exists on the impact of the procurement internal control systems on the cost-effectiveness in construction projects. Therefore, the current study addresses this gap by examining the impact of a procurement internal control systems (segregation of duties, authorisation process, record keeping and stock control) on the cost-effectiveness in FA construction projects in Tanzanian LGAs.

The remainder of this paper is divided into six sections. The next section provides a review of the literature, followed by the methodology. Thereafter, the findings and discussion are presented. The subsequent section offers the conclusions, while the final two sections discuss the study's implications and limitations.

2. Literature review and hypothesis development

2.1 Theories governing the study

This study is grounded in two complementary theoretical perspectives: Institutional theory and agency theory. These frameworks provide a more holistic understanding of the way procurement internal control systems influence the cost-effectiveness of FA construction projects.

2.1.1 Institutional theory

Institutional theory, as presented by Scott (2004), offers a framework for understanding how organisations are shaped by the broader institutional environments in which they operate. Scott (2004) defines institutions as multifaceted, enduring social structures composed of symbolic elements, social activities, and material resources. Thus, institutions influence organisational behaviour through three main pillars: the regulative, normative, and cultural-cognitive systems. Organisations may feel pressured to adapt to commonly accepted behaviours in order to obtain legitimacy (Dacin, 1997) and maintain a socially relevant position (Brammer et al., 2012; Campbell, 2007). The regulative pillar emphasizes rules, laws, and enforcement mechanisms that guide actions through coercion or incentives. The normative

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pillar focuses on values and norms, shaping behaviour through social obligations and moral expectations. Lastly, the cultural-cognitive pillar centres on shared understandings and taken-for-granted beliefs that individuals internalize and use to interpret the world around them. Of these, the regulatory pillar is most pertinent to this study. It focuses on formal rules, laws, and compliance mechanisms that enforce behaviour through sanctions or incentives.

In this study, the institutional theory provides a clear understanding of how procurement internal control systems influence the cost-effectiveness in construction projects. This theory emphasises the role of social norms, rules, and regulatory frameworks in shaping organisational behaviour (Muhwezi et al.,2023; Nawaz & Guribie, 2024). In the context of procurement, internal control systems ensure compliance with these institutional rules, promoting transparency, accountability, and efficiency (Azman et al.,2024). Key components of these systems, such as the segregation of duties, ensure that no single individual has control over all aspects of a procurement transaction, thereby reducing the risk of fraud and errors (Cao & Wang, 2023). Stock control mechanisms help in managing inventory efficiently, preventing overstocking or stockouts. The authorisation process ensures that all procurement actions are approved by appropriate personnel, maintaining a high level of accountability. Record keeping provides a transparent audit trail, facilitating monitoring and evaluation of procurement activities. From an institutional perspective, these controls enhance organisational legitimacy and compliance with best practices, ultimately leading to more efficiency and cost-effectiveness in FA construction projects. Also, by adhering to regulatory requirements and standardising procurement processes, these controls reduce the likelihood of unforeseen expenses, contributing significantly to the cost-effective outcomes in construction projects.

2.1.2 Agency theory

The agency theory describes the relationship between a principal and agent in which the principals assign decision-making authority to agents to perform certain services on their behalf (Jensen & Meckling, 1976). However, conflicts of interest may arise between the agent's objectives and the principal's interests, resulting in agency problems (Leepsa & Panda, 2017). To address these concerns, the principal plans to develop systems that align the agent's interests with their interests. In this study, the procuring entity acts as the principal and assign the activities to the members of FA committees as agents. Existing procurement internal control systems are very important towards enhancing the principal and agents' interests through encouraging the cost-effectiveness in the whole construction process. For instance, a study done by Adi and Rohman (2023) indicated the application of agency theory in the relationship between internal control systems and fraud prevention in procurement goods and services. As per agency theory, internal control mechanisms such as monitoring activities, clear performance measurement and incentives enable to minimise of information asymmetry and opportunistic behaviours. In regard to procurement internal control systems, the principal can believe that the agents try to fulfil the principal interest by minimising the cost of construction through optimal resource utilisation. In the present study, procurement internal controls such as segregation of duties, authorisation process, record keeping, and stock control relate with the agency theory. As agents, if they adhere to these indicators, they can be able to make proper decisions based on the principal interests.

2.2 Hypotheses

2.2.1 Segregation of duties and cost-effectiveness

In project management, segregation of duties is essential to ensure suitable control and accountability through separating activities among different personnel in the project (Chiu & Jans, 2019). Dividing responsibilities can help to minimise the risk of mistakes and fraud, as well as help to prevent conflicts of interest. The literature appreciates the role of segregation of duties in enhancing project performance. For instance, the study conducted by Ferrer et al. (2020) and Rattini (2023) indicated that a well-defined project through segregation of duties leads to high levels of accountability, proper risk control, and, lastly, enhances the performance of projects. Similarly, Lill et al. (2020) emphasised that clear segregation of duties helps to reduce the probability of errors and improve the quality of the project. The reviewed studies recommend that a good segregation of duties in projects enhances the chance of improving accountability, risk management, and the success of the whole project. The literature has well studied the advantages of segregation of duties in terms of accountability, risk management, and project performance, but its effect on cost-effectiveness, especially in the context of FA construction projects, has received less attention. Without fully analysing how these techniques affect the cost-effectiveness of project execution, existing studies such as Lill et al. (2020), and Satheesh et al. (2023) have mostly concentrated on results like error reduction and quality enhancement. Hence, the present study focuses on the angle of cost-effectiveness in FA construction projects through the segregation of duties. Based on this, the following hypothesis is proposed:

H1: Segregation of duties positively affects cost-effectiveness in FA construction projects

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2.2.2 Authorisation process and cost-effectiveness

To ensure transparency and accountability in the organisation, a clear authorisation process is necessary as it helps to formulate procedures and guidelines for initiation of the project, controlling of expenditure and proper budgeting (Winata & Gultom, 2024). In public construction projects, authorisation process is essential because it helps to obtain necessary approvals of the project life cycle, starting from project commencement up to the authorisation of payment after project completion (Bhagat & Jha, 2023). Previous studies establish the link between the authorisation process and financial performance, business performance and success of the project. For example, the study done by Njoka and Gikonyo (2023) investigated the relationship between the approving procedures and the performance of projects. They highlighted that a well-structured approving procedure significantly influences the performance of the project. Likewise, Ngari (2017) conducted a study on authorisation procedures and the financial performance of construction projects. The study indicated that a clear and well-established authorisation process in terms of clear guidelines and effective control enhances financial performance. The reviewed studies mainly focused on improving business performance and project performance through approving processes but evidence is missing in the linkage between the authorisation process and cost-effectiveness in FA construction projects. Therefore, the study proposes the following hypothesis:

H2: Authorisation process positively affects cost-effectiveness in FA construction projects

2.2.3 Stock control and cost-effectiveness

In construction projects, stock control is relevant in minimising delays and enhancing efficient utilisation of resources through ensuring availability of materials when needed for construction activities (Ochelle, 2017). Stock control activities in construction projects include monitoring stock levels, keeping accurate stock records, proper forecasting of materials requirements and proper issuing and receiving of materials (Bajomo et al., 2022). Having required materials when needed enhances the smooth progress of construction projects because disruptions are avoided. The literature shows a positive link between good stock control procedures and project performance. For example, improved stock control has been linked to reduced material waste, project delays, and improved resource utilisation (Ashika & Monisha, 2019; Frontoni et al., 2020). Consequently, stock control is an essential component in the procuring entity and is associated with greater performance. Most studies have utilised cost to measure project performance (Alavipour & Arditi, 2018; Firouzi et al., 2016). The present research focuses on the cost-effectiveness in FA construction projects through stock control. Then, the following is proposed:

H3: Stock control positively affects cost-effectiveness in FA construction projects

2.2.4 Record keeping and cost-effectiveness

Effective assessment of organisational procurement performance relies on the utilisation of available records. To achieve this, it is necessary to develop, gather, and manage relevant records in a proper manner (ISO, 2016). That is why past research has linked records management with performance outcomes. Matto (2022) believes that strong record keeping helps to save costs. Namukasa (2017) and Ahimbisibwe (2016) found that despite the benefits of manging records, such as improved organisational performance, most organisations do not prioritise it. According to Mohamed et al. (2018), the relevance of records management is often undermined in underdeveloped countries. The stud's premise is on the fact that records keeping positively enhances cost-effectiveness in FA construction projects. Organisations preserve records for a variety of purposes, including compliance with legal requirements. In Tanzania, section 71 of the Public Procurement Act (PPA) of 2023 mandates all public organisations to keep a record of their procurement operations for at least 5 years after the contract is completed. Record keeping helps the organisation to identify suppliers through tracking previous performance and helps the project manager to make informed decisions. Thus, studying the role of procurement records in the cost-effectiveness in construction projects is necessary. Previous studies indicated that records keeping improves organisational performance and helps in saving costs, but limited evidence prevails on the link between record keeping and cost-effectiveness in FA construction projects. The study proposes the following:

H4: Record keeping positively affects cost-effectiveness in FA construction projects

3. Methodology

3.1 Study area and research design

This study was conducted in selected LGAs in the Dodoma region, Tanzania specifically focusing on primary schools implementing FA construction projects. LGAs were chosen because they have a higher number of FA construction projects compared to other categories of procuring entities. For example, the PPRA audit in 2021 revealed that 492

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projects were undertaken under FA, of which 455 belong to LGAs, 25 to parastatal organisations, and 12 to agencies, with a total value of TZS 63 billion. Dodoma region was chosen as the study area to collect information on FA construction projects in primary schools since it has a large number of FA construction projects. For example, in the financial year (FY) 2021/2022, a budget of 2.71 billion was set up for the construction of 237 primary school classrooms. Similarly, a budget of 2.79 billion was set out for classroom and teacher housing building in FY 2022/2023 (URT, 2022, 2023). Most of these projects were conducted in primary schools within Dodoma region (URT, 2022). A cross-sectional research design was adopted, which entails gathering data at a specific point in time. This design is suitable because it is capable and efficient of gathering a large amount of data in a very short period, easy to minimise cost, and appropriate for the study, which intends to analyse the causal relationship of the variables (Changalima et al., 2021; Setia, 2016). Also, the design is useful in this study because the study objectives were not to capture information on changes over time but to get a general snapshot of the relationship between variables of the study.

3.2 Sample size and data collection

The unit of analysis for this study was construction projects, while the unit of inquiry was the members of the FA committees responsible for supervising and executing FA construction projects at the primary school level. Initially, a total of 120 primary schools were picked from selected LGAs in Dodoma region. The selection was based on the presence of FA construction projects. This purposive sampling ensured that only schools with relevant implemented FA projects were included, allowing for focused data collection aligned with the study's objectives. The sample size of the study was calculated by means of Yamane's (1967) formula ($n = N/ [1+ N (e^2)]$) as used by other previous studies (Kazungu & Kubenea, 2023; Mushi et al.,2024), considering a 95% confidence interval. Following the use of Yamane's formula, the estimated sample size was 327 respondents from 1800 respondents who were obtained from 120 primary schools and 15 members of FA committees in selected LGAs. However, Dolnicar et al. (2016) suggested that increasing the sample size can enhance the statistical power of the study and increase the response rate. Therefore, the sample size for this study was increased from 327 to 360 respondents; however, responses from only 318 respondents were included in the final analysis. In each selected school, three (3) FA committee members were chosen using simple random sampling. These members were selected from the three main committees involved in FA construction projects as outlined in the FA guidelines: the procurement committee, the construction committee, and the receiving and inspection committee. Each of these committees typically consists of five (5) members, but one (1) representative from each was randomly selected, resulting in three respondents per school. This approach was chosen to ensure fair representation from all key areas of FA project management team, while maintaining a manageable and representative sample size. This approach reduces bias and increases the generalisability of the findings (Noor et al., 2022).

3.3 Data collection method

The collection of data was conducted by using a questionnaire because the method is very powerful in collecting a large number of responses from respondents in a reasonable time. The questionnaire was structured based on the study's variables. Items related to the study's main variables were used to formulate questions which were responded to by the FA committee members. Prior to full-scale data collection, the study used professional experts to pre-test questionnaires to ensure content validity. Also, the pilot study was conducted in Morogoro region, where data was not collected in order to ensure the clarity and comprehensiveness of the questionnaire. Therefore, the study used 25 experts who were capable with experience (at least a 5 years) in managing FA projects. Feedbacks were obtained and the final questionnaire was improved to accommodate their recommendations. Data for this study were gathered from March to December of 2023. Additionally, questionnaires were physically distributed, the study utilised the drop-and-pick technique in order to guarantee a greater response rate (Allred & Ross-Davis, 2011). This strategy was designed to offer respondents adequate time and increase the possibility of getting a sufficient number of completed questionnaires.

3.4 Measurement of study's variables

The segregation of duties, authorisation process, stock control, and records keeping were included in the study as independent variables, while cost-effectiveness was a dependent variable. The way the questionnaire was designed in this study was determined by the items that were derived from earlier research with minor modifications adhering to the scope of this research. Specifically, the variable 'segregation of duties' was measured using items from Ferrer et al. (2020). The authorisation process was measured using items that were from Ngari (2017). Stock control was measured by items adapted from Frontoni et al. (2020). Record keeping was measured by items derived from Matto (2022) and Namukasa (2017). Furthermore, cost-effectiveness was measured by using items from Albtoush et al. (2020) and Sinesilassie et al. (2017).

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3.5 Data analysis

Data analysis was carried out using covariance based-structural equation modelling (CB-SEM). CB-SEM is recognised as a highly powerful and reliable multivariate statistical model for analysing latent variables (Hooper et al., 2008).). SEM was suitable for the research, which contained multiple constructs assessed by using different numbers of items. Also, the study used CB-SEM because of having an adequate sample size, and the study aimed to test the hypothesis (Hazen et al., 2015). In the procurement contexts, studies such as Changalima et al. (2024), Kusi-Sarpong et al. (2022), CB-SEM were used as a data analysis method to test the relationship of the variables, which is why this study considered CB-SEM to conduct analysis. Also, in construction research, CB-SEM were used in different studies (Khoza & Haupt, 2021; Zaman et al., 2021). The study also used exploratory factor analysis (EFA) to analyse the relationship of the factors before running the model in AMOS 21 software. During analysis in EFA, it was noted that 19 items were considered for further analysis out of 26 items which were initially established. This decision was reached because it was observed that 7 items overlap each other. To avoid issues with multicollinearity and to enhance the clarity of the analysis, the 7 overlapping items, which measured similar or highly correlated constructs, were excluded to be part of the analysis in AMOS 21.

4. Findings and discussion

4.1 Characteristics of respondents

Table 1 shows that the majority who participated in this study were all members of FA committees in primary schools' construction projects, with ages ranging between 28 and 37 years (142 respondents, 44.7%), followed by those aged 38–47 years (115 respondents, 36.2%), 18–27 years (38 respondents, 11.9%), and 48–57 years (23 respondents, 7.2%). The results further show that most respondents were male (223, or 70.1%) compared to female (95, or 29.9%). Regarding educational qualifications, most respondents held diplomas (144, or 45.3%) and certificates (94, or 29.6%), followed by those with bachelor's degrees (75, or 23.6%) and only a few with master's degrees (5, or 1.5%). This educational profile is consistent with the nature of staffing in primary schools in Tanzania, where most teachers the main participants in FA committees are required to possess certificate or diploma qualifications. Advanced degrees such as master's are not commonly required for their roles. As such, the low representation of master's degree holders does not indicate a bias but rather reflects the realistic educational structure of the FA committee members in the education sector.

In terms of experience, 163 (51.3%) respondents had between 4 to 6 years of involvement in FA construction projects, while 155 (48.7%) had 1 to 3 years of experience. Committees' roles were also well distributed, with 111 (34.9%) respondents from the procurement committee, another 111 (34.9%) from the receiving and inspection committee, and 96 (30.2%) from the construction committee. Therefore, these results indicate that the members of the FA committees who participated in this study possess adequate knowledge of managing FA construction projects in primary schools, supported by their relevant education and practical experience. Although there is a low representation of advanced academic qualifications, the composition of the sample aligns with the operational and demographic realities of FA implementation in Tanzania's LGAs, thus supporting the relevance and applicability of the findings.

Table 1. Characteristics of respondents

Demographics	Categories	Frequency	Percentage (%)
Age	18-27	38	11.9
	28-37	142	44.7
	38-47	115	36.2
	48-57	23	7.2
Sex	Male	223	70.1
	Female	95	29.9
Education	Certificate	94	29.6
	Diploma	144	45.3
	Bachelor degree	75	23.6
	Master's degree	5	1.5
Experience in FA	1-3	155	48.7
	4-6	163	51.3
Type of FA committee	Receiving and inspection committee	111	34.9
	Construction committee	96	30.2
	Procurement committee	111	34.9

Source: Table by the authors

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4.2 Common method bias

To assess the presence of common method bias, the Harman single-factor test was employed. An unrotated factor analysis was performed to determine if a single factor could account for most of the observed variance. The results indicated that approximately 36.64% of the variance could be ascribed to a singular cause. Therefore, common method bias was not a major issue as the common method bias could be an issue if the value is above 50% (Podsakoff et al., 2003).

4.3 Reliability and validity

The findings presented in Table 2, all of the Cronbach's alpha (a) values are higher than 0.7, which is a value that is considered to be satisfactory for the reliability of internal consistency. In a similar vein, the values of composite reliability (CR) were observed to be 0.7 and above, which is also recommendable, given that the recommended values ought to be 0.7 and above (Hair et al., 2020). Furthermore, there is the achievement of convergent validity since all values of factor loadings were greater than 0.6 (Hair et al., 2009), and the average variance extracted (AVE) was utilised to guarantee convergent validity. It is generally accepted that AVE values that are more than or equal to 0.5 are acceptable (Ab Hamid et al., 2017).

Table 2. Reliability and validity

Variables/items	**Factor loadings**	**α**
Segregation of duties (SGA) (AVE= 0.709, MSV=0.367, CR=0.907)		0.736
• No interference with responsibilities in the project	0.897	
• Every team member of the project works independently	0.891	
• The team's responsibilities differ from other team members in the project.	0.868	
• Members of one team can perform the responsibilities of other teams.	0.867	
Stock control (STC) (AVE= 0.660, MSV=0.288, CR=0.885)		0.729
• We conduct a regular and accurate stock check	0.900	
• Materials are kept in a safe custody room	0.863	
• Materials are issued based on the requirements of the site	0.845	
• Inspection records for received materials are thorough and accurate	0.801	
Record keeping (REK) (AVE= 0.581, MSV=0.394, CR=0.847)		
• We usually record each transaction in the project	0.876	0.742
• All contracts/agreements with stakeholders are properly documented and stored	0.867	
• All receiving and issuing of materials are recorded properly	0.777	
• All invoices and receipts are systematically recorded and stored	0.760	
Authorisation process (AUT) (AVE= 0.538, MSV=0.367, CR=0.821)		0.710
• Authorisation of material performed by a responsible person	0.825	
• Authorisation procedures are conducted in an efficient manner	0.825	
• A different person does the initiation and approval of materials	0.739	
• Approving procedures are done without influencing each other	0.687	
Cost-effectiveness (COE) (AVE=0.507, MSV=0.394, CR=0.747)		0.702
• We consistently track project expenses against the budget.	0.687	
• We managed to reduce procurement costs in the projects	0.708	
• There is better measurement tracking and reporting incurred costs and realised benefits in the project	0.798	

Source: Table by the authors

According to Fornell and Larcker (1981), discriminant validity was attained since the square root of AVE in Table 3 was discovered to be greater than the intercorrelation value of the variables with one another. Also, the results in Table 2 shows that the maximum shared variance (MSV) for all constructs was lower than their corresponding AVE values, thereby confirming the presence of discriminant validity among the study constructs.

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Table 3. Discriminant validity

Variables	SGA	STC	REC	AUT	COE
SGA	***0.842***				
STC	0.339	***0.812***			
REC	0.322	0.462	***0.762***		
AUT	0.606	0.488	0.335	***0.733***	
COE	0.476	0.537	0.628	0.563	***0.712***

Source: Table by the authors

4.4 Assessment of measurement model

Confirmatory factor analysis (CFA) was conducted in AMOS 21 software to assess the model's fit and the psychometric properties of the measurement model, as illustrated in Table 4. The goodness-of-fit statistics (χ^2/df = 1.945, goodness of fit index (GFI) = 0.917, comparative fit index (CFI) = 0.958, Tucker-Lewis index (TLI) = 0.949, Incremental fit index (IFI) = 0.958, Adjusted goodness of fit index (AGFI) = 0.889, RMSEA = 0.055) demonstrated that the model accurately represented the observed data (Hair et al., 2009; Hooper et al., 2008). Convergent and discriminant validity, internal consistency, and reliability were evaluated to determine the psychometric properties of the latent variables and the measurement items.

Table 4. Fit statistics of CFA

Measure	Estimate	Threshold	Interpretation
χ^2/df	1.945	1 to 3	Excellent
RMSEA	0.055	< 0.06	Excellent
GFI	0.917	> 0.80	Acceptable
AGFI	0.889	> 0.80	Acceptable
RMR	0.032	< 0.05	Acceptable
CFI	0.958	> 0.95	Excellent
TLI	0.949	> 0.95	Excellent
IFI	0.958	> 0.95	Excellent

Source: Table by the authors

4.5 Relationships between study's variables in the structural model

The fit indices for the structural model, as presented in Table 5, fall within the recommended range as indicated by Hooper et al. (2008). This signifies that the findings substantiate and validate the postulated structural framework. Subsequently, we conducted a path analysis, as depicted in Figure 1, to examine the impact of variables such as segregation of duties, authorisation procedure, stock control, and record keeping on the cost-effectiveness in FA construction projects.

Table 5. Relationships between study's variables

Hypothesised relationship			Estimate	S. E	T-value	p-value	Decision
COE	<---	SGA	0.094	0.056	1.668	0.095	Rejected
COE	<---	STC	0.165	0.068	2.437	0.015	Accepted
COE	<---	REC	0.355	0.060	5.957	0.000	Accepted
COE	<---	AUT	0.233	0.074	3.145	0.002	Accepted

Note(s): Model fit indices: GFI= 0.909, NFI=0.908, IFI=0.949, TLI=0.938, CFI=0.948, AGFI=0.880, RMSEA=0.060 and χ2/df = 2.150

Source: Table by the authors

4.5.1 Segregation of duties and cost-effectiveness in FA construction projects

Based on the results presented in Table 5, it was found that there is no significant relationship between the segregation of duties and cost-effectiveness in FA construction projects (p = 0.095 and β = 0.094). Therefore, this finding does not support H1, suggesting that an increase in the segregation of duties does not have an impact on the cost-effectiveness in FA construction projects. The possible explanation for this finding could be attributed to the nature of operations in FA construction projects in primary schools, particularly regarding the separation of activities between different committees. There may be interference or overlapping of activities between committees. For example, in some cases, the activities that the procurement committee should carry out might be performed by the construction committee. This lack of clear separation and overlap of responsibilities could lead to inefficiencies and increased costs. Additionally, if

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the procurement committee lacks independence and transparency, it may make biased or inefficient purchasing decisions, resulting in higher costs. Likewise, in the receiving and inspection committee when, receiving goods without thorough checks leads to the possibility of delays, rework and later increased project cost. Thus, segregation of duties in FA construction projects may not influence cost-effectiveness.

These findings are consistent with those of Ejoh and Ejom (2014). Their research found that the segregation of duties does not influence financial performance. However, the study contradicts previous research done by Ngari (2017), who established the relationship between the segregation of duties and financial performance. The study highlighted that, if the organisation is able to segregate the duties efficiently, there is a big chance of increasing performance of financial because individuals will strive best to ensure their activities are done efficiently. The discrepancy between this study and that of Ngari (2017) may be attributed to contextual differences in implementation environments. Ngari's study may have been conducted in a more structured or better resourced setting where segregation of duties is systematically enforced and monitored. In contrast, the current study focuses on FA construction projects in Tanzanian primary schools, where resource limitations, staffing constraints, or informality in committee operations might reduce the effectiveness of segregation of duties, even when formally in place. As a result, the expected benefits of segregation may not be fully realised, leading to the observed lack of significant influence on cost-effectiveness.

Additionally, the findings contradict the institutional theory, which suggests that adherence to rules, guidelines, and regulatory frameworks that are developed within the organisation's environment enhances organisational legitimacy and efficiency. As per this theory, the segregation of duties is an important component towards promoting transparency, accountability, and internal checks and balances. The organisation will be able to prevent fraud, errors, and conflicts of interest if the duties are segregated, hence improving the cost-effectiveness of construction projects and overall performance.

4.5.2 Stock control and cost-effectiveness in FA construction projects

The results, presented in Table 5, provide support for H2 ($p = 0.015$ and $\beta = 0.165$). The result implies that stock control is a positive and significant predictor of cost-effectiveness in FA construction projects. In this regard, the study establishes that stock control influences cost-effectiveness in FA construction projects. The most obvious explanation for this is that stock control allows organisations to determine the maximum and minimum level of stock required for construction. Running out of stock is a problem for construction projects because it leads to delays and idle time and consequently increases the cost of the project. Thus, through stock control, the organisation can improve activities of construction because the materials will be available when needed to be used in the project. Hence, cost-effectiveness will be achieved. Also, through proper tracking of stock levels and usage of materials, the organisation can be able to identify any shortage caused by theft or pilferage. Through this stock control, the organisation will be able to solve the issue of financial loss and promote transparency and accountability in FA construction projects. This control helps to prevent financial loss and encourages transparency and accountability in the construction process. Stock control in construction projects is also related to ensuring the quality of materials through inspection during the receiving of materials. The inspection committee will be able to inspect all the incoming materials in order to be sure of the intended quality for the sake of avoiding substandard materials, which may increase the cost of construction projects due to delays and rework of the project to rectify the problem.

These findings are consistent with those of Bajomo et al. (2022), who observed the relationship between stock control and cost-effectiveness. The study emphasises that ineffective material management is the primary reason for the project's delay and the loss of financial resources. The study recommends that the organisation should ensure there is proper management of materials by applying different techniques of controlling them in order to avoid the loss of financial resources because materials are key components in the organisation. Also, the study aligned with the institutional theory, which emphasises adhering to the rules and regulatory framework in the organisation. Hence, the project participant, through observing these principles of institution theory, will be shaped in their behaviour of increasing care to the organisation's assets; hence the stock control will be achieved in order to reduce the cost of construction projects. Additionally, the findings resonate with agency theory, which highlights the need for aligning the interests of stakeholders to ensure accountability and efficiency. By establishing effective stock control practices and adherence to institutional norms, organisations can mitigate conflicts of interest and ensure that resources are utilised effectively, ultimately improving cost-effectiveness in construction projects.

4.5.3 Record keeping and cost-effectiveness in FA construction projects

The hypothesis developed was accepted since the results in Table 5 indicated that H3 ($p < 0.001$ and $\beta = 0.355$). This implies that record keeping is an important factor in influencing the cost-effectiveness in FA construction projects. A clear explanation for this is that keeping procurement record is vital for promoting transparency and accountability. If

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there are weaknesses in this aspect, it can affect how efficiently and effectively public procurement systems operate (Namukusa, 2017). The organisation needs to recognise the importance of maintaining records. According to Section 71 of the PPA 2023, the procuring entity must retain records of procurement or disposal activities for at least five years after fulfilling the contract. These essential records include bidding documents produced by the purchasing organisation, copies of tender documents submitted by the bidders, tender files, contract documents, and records of contract implementation, among others. These documents help the organisation to monitor and control costs throughout the project life cycle because all information concerning materials usage, labour hours, price of purchases and equipment usage will be accessible for tracking actual cost against the budgeted amount. The available information will enable project participants to identify potential cost overruns at an early stage and make it easy to take corrective measures to control expenses.

These results are aligned with Namukasa (2017) study, which also identified a significant relationship between record keeping and procurement performance. Similarly, Matto (2022) observed that record management attributes have a great impact on procurement performance in Tanzania. Further, the study highlighted that records management influences the efficiency and effectiveness of procurement operations. Also, this study aligned with institutional theory by emphasising the importance of adhering to organisational rules, guidelines and practices, such as record keeping, in shaping the behaviour and outcomes of people in achieving the cost-effectiveness in FA construction projects. Furthermore, from the perspective of agency theory, effective record keeping serves as a mechanism to align the interests of stakeholders. By ensuring transparency and accountability in procurement processes, organisations can reduce information asymmetry and enhance trust, ultimately improving overall performance and cost-effectiveness in construction projects.

4.5.4 Authorisation process and cost-effectiveness in FA construction projects

The focus was to determine whether there is a relationship between the authorisation process and cost-effectiveness, as hypothesised in the H4. Results establish that there is a link between the authorisation process and the cost-effectiveness in FA construction projects ($p < 0.001$ and $\beta = 0.233$). This implies that there is a significant relationship as the authorisation process acts as a protection against unauthorised expenditure, which may help to align project activities with the approved plan and budget. This is evident as no purchases can be made without approval by the designated personnel who review the purchase request, confirm the necessity of the purchase, comply with the budget and observe overall procurement procedures. Through the proper authorisation process, the procuring entity will be able to mitigate risks and financial control and improve the procurement operations. Also, the authorisation process may contribute to reducing the possibility of corruption and mismanagement of funds and later promote accountability, integrity and transparency in construction projects. Hence, achieving the cost-effectiveness in FA construction projects through the authorisation process is necessary.

The findings are consistent with the study done by Primanda and Harahap (2019), who establish the importance of the authorisation process in the organisation. The study indicated that, the authorisation process acts as a mechanism to check, verify and validity of transactions to ensure they comply with the relevant policies of the organisation. Furthermore, the findings align with institutional theory, which emphasises the role of establishing regulatory frameworks, norms and attitudes in shaping organisational behaviour. The theory suggests that through implementing a proper authorisation process, the organisation can be able to achieve the intended performance. This is because the authorisation process can increase accountability and transparency in construction projects, which is highly influenced by adhering to established laws, guidelines and norms as suggested by institutional theory. As a result, adhering to institutional theory principles in the authorisation process not only helps in achieving cost-effectiveness but also enhances the overall governance and ethical standards within the construction industry.

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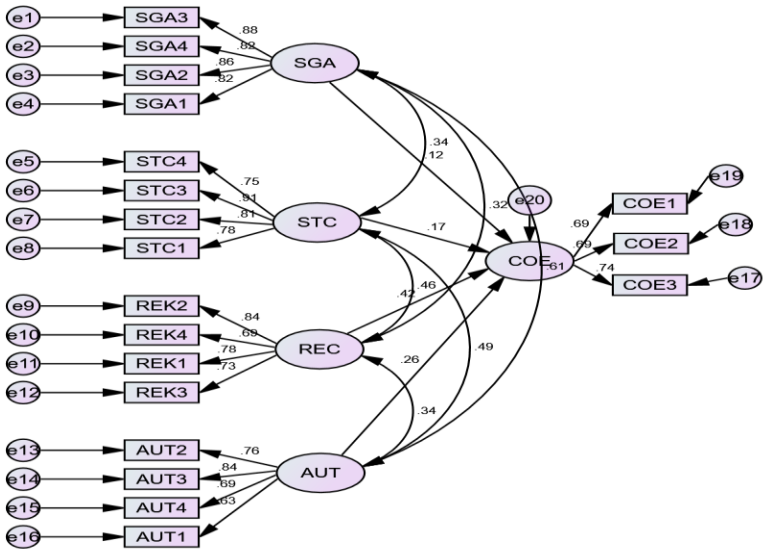

Figure 1. The structural model
Source: Figure by authors

5. Conclusion

This study examined the role of the procurement internal control systems on the cost-effectiveness in FA construction projects. The study concluded that record keeping is the main factor among the three that explains the relationship between the procurement internal control system and the cost-effectiveness in the FA construction projects, as the coefficient beta is high compared to all other variables. Furthermore, except for 'segregation of duties', all variables of the procurement internal control systems were found to have a positive and significant effect on cost-effectiveness in the FA construction project. In this regard, implementing effective procurement internal control systems will help the organisation to achieve the cost-effectiveness in the construction projects because all issues associated with fraud, improper materials management and inefficiency in the procurement process will be solved through proper procurement internal control systems. Also, the findings of this study indicate that procurement practitioners and FA committees have a greater chance of achieving cost-related objectives and reducing the expenses associated with public procurement if they do a good job of adhering to procurement internal control systems in construction projects.

6. Study's implications

6.1 Theoretical implications

Guided by institutional theory and agency theory, this study examined the influence of procurement internal control systems on cost-effectiveness in FA construction projects in Tanzania. The findings provide significant theoretical contributions to both institutional and agency theories and expand the current body of knowledge on cost-effectiveness in construction project implementation, especially within the Tanzanian context. From an institutional theory perspective, the study reinforces the notion that adherence to established rules and regulatory frameworks is critical in enhancing procurement internal control system. It highlights that when actors in FA construction projects comply with institutional frameworks such as procurement regulations are more likely to establish and implement internal control systems. These systems, in turn, lead to improved cost-effectiveness in FA projects. In addition, the study contributes to agency theory by addressing the principal-agent relationship within public construction projects. Agency theory emphasises the challenges of goal misalignment and information asymmetry between principals (procuring entities) and agents (FA committees). This study suggests that strong procurement internal control systems can serve as monitoring mechanisms to reduce opportunistic behaviours, ensure accountability, and align the interests of agents with those of the principals. By mitigating agency problems, procurement internal controls enhance transparency, minimise wastage, and improve cost-efficiency in FA projects.

6.2 Practical implications

The study provides reflections and practices that contribute to knowledge among procurement experts and force account implementation committees about establishing and adhering to proper procurement internal control systems.

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Through the authorisation process, stock control, and record keeping, procurement experts and committees will be able to control cost, resource utilisation, and overall project performance. The findings of the study can help procure entities improve their procurement internal control systems to achieve the cost-effectiveness in FA construction projects. Also, the study contributes to the public and procurement policy on enhancing the procurement internal control system for achieving cost-effectiveness.

7. Limitations of the study

The limitations of this study stem from the environments under which it was conducted. The study focused on LGAs as public entities in Tanzania, which are managed and regulated by the country's legal procurement system. Thus, the findings should be interpreted with caution as legislative frameworks that oversees public procurement activities, including force account projects may differ among countries. In addition, other indicators of building performance can be included, as the current study focuses primarily on cost-effectiveness. The study recommends that future studies to be conducted on assessing the quality attainment of FA construction projects through procurement internal control systems as also observed to be the problem in public projects. Furthermore, the study based on the direct effects of procurement internal control systems on cost-effectiveness. Therefore, the need for developing and testing structural models that include potential mediators and moderators could be crucial for advancing the existing knowledge.

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