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# Enhancing Procurement Quality Performance in a Developing Country: The Roles of Procurement Audit and Top Management Commitment

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**ABSTRACT**

Despite its strategic importance, procurement quality performance remains not only a difficult-to-improve public procurement outcome in developing countries but also knowledge of its determinants is underdeveloped. This research uses a contingent-agency perspective to propose procurement audit as a procurement quality performance-enhancer, especially when there is a strong top management commitment to strategic procurement issues. Survey data from 223 public sector organizations in Ghana support these propositions. Additional results, however, reveal that internal and external aspects of procurement audit relate differently to self-reported procurement quality performance under differing conditions of top management commitment. Theoretical and practical implications of these findings are presented.

**KEYWORDS**

Procurement audit; quality performance; top management commitment; contingent-agency perspective; developing economy

## Introduction

Public procurement is rapidly transitioning from a tactical and passive function to a strategic function (Patrucco et al., 2019), encouraging quality-based procurement (Balaeva et al., 2021; Patrucco et al., 2016). Consistent with the logic of supply chain quality management (Phan et al., 2019), strategic procurement accentuates procurement quality performance as crucial for attaining strategic outcomes (Anin et al., 2020; Essuman et al., 2021). Procurement quality performance reflects the extent to which procured items conform to need specifications and end-user expectations (Patrucco et al., 2016; Yeung et al., 2015).

Despite its strategic importance, public sector organizations in developing countries face a major challenge in improving procurement quality performance (Balaeva et al., 2021; OECD, 2016). For instance, in their study of the Russian public procurement system, Balaeva et al. (2021) found that though 77% of procurers and 67% of suppliers consider high-quality supplies as imperative, 60% of procurers and suppliers regard low-quality supplies as the most frequent problem in the country. Such issues take on added significance as developing countries spend about $820 billion yearly in procuring goods and services (The World Bank, 2018), and they must translate such huge spending into enhanced procurement quality performance to bolster sustainable development (Essuman et al., 2021; Patrucco et al., 2019).

In the public sector, poor procurement quality performance largely results from corrupt procuremen practices (Balaeva et al., 2021; OECD, 2016), which justifies and promotes procurement audit (Ibrahim et al., 2017; Sabet, 2020). Procurement audit, the extent to which procurement processes are subjected to periodic independent evaluation to identify and address weaknesses to ensure compliance with procurement policy and requirements, might benefit procurement quality performance due to its potency to curb fraud while fostering value-for-money (Hay & Cordery, 2021; Sabet, 2020). Nonetheless, the public and rigid nature of procurement audit activities can trigger adversarial responses from procurement officials and may further undermine opportunities for improvement (Raudla et al., 2016). As Balaeva et al. (2021) note, stricter procurement regulations can weaken the capacity to differentiate opportunism from honest informal procedures aimed at improving procurement quality performance. Indeed, not only are the expected benefits of public audit activities highly contested (Sabet, 2020) but also previous research findings suggest that public audit activities may not always lead to enhanced

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.

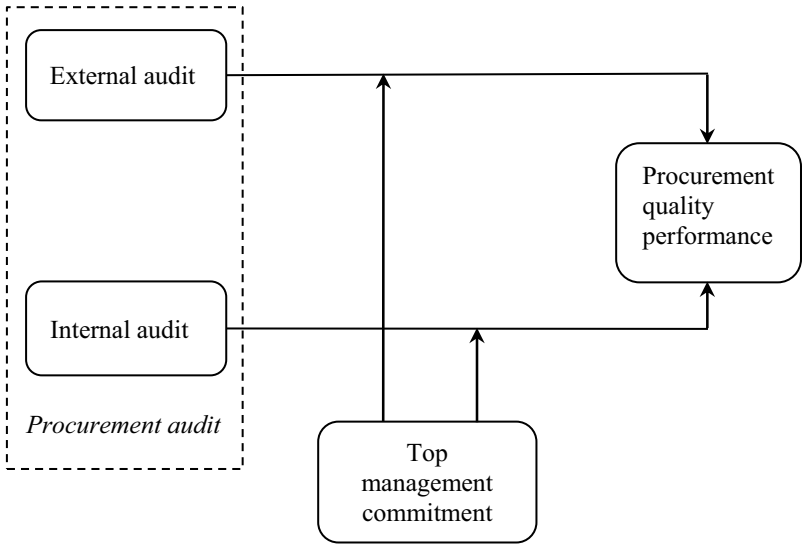


**Figure 1.** Conceptual model.

performance outcomes and can sometimes be counterproductive (Bonollo, 2019; Sabet, 2020). Therefore, while an empirical analysis of the relationship between procurement audit and procurement quality performance is necessary (Bonollo, 2019), the contingency theory suggests that specification of the boundary conditions of this relationship is crucial for enhancing theory and practice (Van de Ven et al., 2013).

Therefore, this research extends the contingency theory to the agency theory to propose a contingency model to examine *how* and *when* procurement audit relates to procurement quality performance in a developing country (Figure 1). We argue that procurement audit is essential but may not automatically achieve superior procurement quality performance (Bonollo, 2019) without a conscious effort and support from top executives (Turetken et al., 2019). Particularly, since the implementation of and compliance with audit reports are necessary underlying mechanisms that might achieve enhanced organizational outcomes (Bonollo, 2019), we suggest that a greater condition of top management commitment (TMC) to strategic procurement issues would strengthen the procurement quality performance outcome of procurement audit (Brandon-Jones & Knoppen, 2018). We test the hypotheses that procurement audit is positively related to procurement quality performance (*H1*) and that this relationship amplifies under increasing conditions of TMC (*H2*). Theoretical arguments underlying these hypotheses are developed in the subsequent section. Following this, we describe the empirical data used to test the hypotheses. Next, we present the study's results, contributions, implications, and limitations.

## Theoretical background and hypothesis development

### *Public procurement audit and quality performance*

Organizational leaders (including procurement officials) are expected to act in the best interest of the public by procuring goods and services of the right quality to enable public organizations to fulfill their strategic mandates (Abutabenjeh, 2021). However, public procurement is highly susceptible to opportunism and fraud (OECD, 2016), highlighting an agency problem (Dalton et al., 2007). As the agency theory suggests, mischief is likely to occur when the interests of organizational leaders and the public diverge (Aikins, 2013; Dalton et al., 2007). That organizational leaders may not always act in the best interests of the public is a core proposition of agency theory (Dalton et al., 2007) and, therefore, a primary basis of public sector audit (Sabet, 2020), and in particular, procurement audit (Balaeva et al., 2021; Ibrahim et al., 2017). To minimize the risk of shirking by the agent manager, the principal can adopt monitoring mechanisms such as internal and external audit functions to strengthen institutional governance and enhance the convergence of interests between the principal and agent managers (Raudla et al., 2016; Sabet, 2020).

Internal audit is conducted by, or on behalf of, the organization itself for management review and other internal purposes (The Institute of Internal Auditors [IIA], 2019). Internal audit, with its independent monitoring and controlling capability, can enhance procurement quality performance by reducing bounded

rationality and opportunistic behaviors through the enforcement of corporate governance and internal control mechanisms (Aikins, 2013; IIA, 2019). In addition, by their routine engagements, internal auditors have longer-term relationships with the internal stakeholders and are not seen as outsiders as external auditors are (Morrill & Morrill, 2003; Spraakman, 1997). Consequently, as members of the organization, internal auditors are able to gain the cooperation of procurement officials and receive crucial disclosures and information on procurement processes such as the level of compliance with established procurement procedures, and the effectiveness of the in-built internal controls in the public procurement process. More importantly, and as Spraakman (1997) argues, internal auditors can get insight into whether value-for-money in the area of efficiency, as well as quality, is obtained in the procurement process. Such insight offers organizational leaders the benefit to correct any lapses in the procurement practice to improve procurement quality performance. Thus, we contend that internal audit facilitates continuous improvement in the public procurement process, ensuring that procured supplies conform to specifications. Formally, we test the hypothesis that

*H1a. Internal procurement audit has a positive relationship with procurement quality performance.*

We additionally expect external audit to benefit procurement quality performance. External audit comprises the independent verification of the authenticity of accounting, financial information, and other operational activities of an organization, conducted by audit organizations or individual auditors to hold managers to account (Hollingsworth et al., 1998; Volkova et al., 2017). In the public procurement context, external audit largely focuses on the appraisal of procurement processes to ascertain whether the procurement policies, procedure, and value-for-money principles have been complied with (Hays, 1973). Since external audit subjects procurement transactions to strict scrutiny, procurement officials are obliged to demonstrate professionalism, transparency, and fairness in the discharge of procurement duties. More critically, external audit drives accountability, where procurement officials are statutorily made to account for their stewardship regarding procurement decisions and transactions under their control. These roles of external audit do not only inspire efficiency and a fit-for-purpose purchasing mentality in the public procurement processes but also encourage practitioners to adopt best practices required under public procurement laws and procedures to drive value-for-money. Thus, the external audit regime, with its legally sanctioning capacity, is expected to motivate public procurement officials to exercise sound professional judgment regarding the specification of goods, works and services, supplier selection, contract awards, and post-contract transactions to acquire materials, works, and services that conform to procurement requirements and specifications (Spekman, 1980). Accordingly, we posit that:

*H1b. External procurement audit has a positive relationship with procurement quality performance.*

## Boundary condition role of TMC

Debates and inconclusive findings in the public audit literature suggest that procurement audit may not always benefit procurement quality performance (Sabet, 2020). Such an issue, we contend, can better be explained using the contingency theory (Van de Ven et al., 2013). From the contingency perspective, the efficacy of procurement audit is a function of organizational circumstances (Sabet, 2020), to the extent that procurement audit ought to be matched with appropriate structures to achieve its full potential in driving procurement quality performance (Donaldson, 2006).

The external and internal audits provide independent and objective assurance on corporate governance, risk management, internal control, and compliance (Soh & Martinov-Bennie, 2015). By their functions, auditors are required to provide recommendations to top management regarding deficiencies and weaknesses in procurement to help improve it (Newman et al., 2019). Recommendations in this context represent proposals that result from the audit processes within the procurement function and need to be acted upon to improve procurement outcomes. Prior research indicates that the effectiveness of the audit function is a measure of how its recommendations are implemented (Alzeban, 2020).

Considering the strategic procurement literature, we propose TMC, the extent to which top executives emphasize the strategic importance of public procurement and demonstrate commitment to developing it (Knoppen & Sáenz, 2015), as an important contingent factor that can explain the boundaries of *H1a* & *H1b*. Past studies show that TMC is crucial for enhancing procurement and organizational outcomes (e.g., Brandon-Jones & Knoppen, 2018; Essuman et al., 2021). Resource constraints can cause delays in implementing audit recommendations, undermining the value-adding potential of procurement audit (Sultana et al., 2015). Further, certain audit recommendations may tackle complex operational issues that may require

swift investments (e.g., automation of procurement processes) and radical transformation of procurement processes. A greater TMC is more likely to influence tough decisions and ensure sufficient resources for prompt execution of auditors' recommendations are available for enacting necessary changes to the procurement function (Liang et al., 2007).

The desire and efforts required for implementing audit recommendations largely reside in the power and commitment of top executives who serve as the organization's primary human interface to the external environment (Alzeban & Sawan, 2015; Liang et al., 2007). Accordingly, TMC is expected to inspire the required organizational culture to successfully implement external and internal audit reports (Turetken et al., 2019). This is key because failure to implement audit recommendations will leave the risks and weaknesses identified in the organizations' operations unresolved and thus undermine the procurement quality performance benefit of the audit functions. At the organizational level, in particular, TMC may not only encourage meticulous and rigorous monitoring and review of procurement processes but also motivate the internal auditors to follow up on prior audit recommendations to ensure that deficiencies identified in the procurement operations are addressed. Accordingly, we contend that while internal and external procurement audits might be essential drivers of procurement quality performance, their efficacy is likely to amplify in organizations with a stronger TMC than those with a weaker TMC.

*H2a. TMC positively moderates the internal procurement audit-procurement quality performance relationship.*

*H2b. TMC positively moderates the external procurement audit-procurement quality performance relationship.*

## Research methodology

### Empirical setting

We test our hypotheses using data from public sector organizations (i.e., procurement entities) in Ghana, a major economic force in sub-Saharan Africa and one of the ten fastest-growing economies in the world (African Development Bank Group, 2020). In the last two decades, Ghana has initiated some reforms aimed at streamlining the public-sector purchases to improve value-for-money. More specifically, Ghana enacted public procurement law (Act 663) (2003) as amended in 914 (2016) and established statutory bodies including the Public Procurement Authority and Ghana Audit Service to regulate the public sector procurement process (Bawole & Adjei-Bamfo, 2020). Despite these initiatives, public procurement in Ghana is characterized by irregularities and fraud (Ibrahim et al., 2017; The World Bank, 2021), making it a suitable setting for testing our hypotheses.

### Research design and data collection

Public audit studies involving quantitative analysis normally rely on survey data or archival data (Bonollo, 2019). In public procurement research, pertinent archival data is not only difficult to access, especially in developing economies but also such data tends to capture aggregated and macro-economic issues (Balaeva et al., 2021). Therefore, survey methodology has been the traditional tool for generating insights into procurement issues (e.g., performance) internal to the procuring entity (Balaeva et al., 2021). Accordingly, consistent with previous audit research (see, Bonollo, 2019; Turetken et al., 2019) and procurement quality performance studies (e.g., Balaeva et al., 2021; Essuman et al., 2021), this study uses self-reported survey data to test its hypotheses.

Our unit of analysis is the procurement entity as defined by Ghana's procurement regulation, Act 663, 2003 as amended in 914 (2016); that is, public sector organizations in Ghana that have the autonomy to procure goods, works, and services within the framework of the act. Additional selection criteria were that the procurement entity has an internal audit unit and has been in existence for at least five years. Four key categories of such organizations were considered: State Own Enterprises (SOEs), Metropolitan/Municipal and Districts Assemblies (MMDAs), Government health facilities, and government tertiary education institutions (see, Table 1 for details). Due to informal institutional issues (e.g., power distance culture) and poor mailing systems in Ghana, we approached the key informants in person using a team of trained enumerators (Klingebiel & Stadler, 2015). We contacted 560 of the target public organizations to solicit for their consent to participate in the survey (Patrucco et al., 2016). Out of this number, 453 organizations agreed to participate in the survey and were given the survey packages (cover letter and questionnaire). For each organization, one key informant (a senior manager with knowledge of public procurement issues) responded to the questionnaire (Balaeva et al., 2021; Ibrahim et al., 2017). After a few follow-ups, 241 of the questionnaires were received over sixty days of fieldwork. After analysis of the questionnaires for incompleteness, 223 were considered usable for the study, accounting for 39.82% effective response rate. Details

**Table 1.** Profile information.

| Variables | | Frequency | % | Mean | SD | *F* | *p* |
|---|---|---|---|---|---|---|---|
| Type of public organization | State Own Enterprises (SOEs) | 22 | 9.9 | | | | |
| | Metropolitan/Municipal and Districts Assemblies (MMDAs) | 105 | 47.1 | | | | |
| | Government health facilities | 65 | 29.1 | | | | |
| | Government tertiary education institutions (e.g., universities, training colleges) | 31 | 13.9 | | | | |
| Informant's position | Top executive (CEO/director) | 30 | 13.5 | | | | |
| | Procurement manager | 127 | 57.0 | | | | |
| | Internal audit official | 66 | 29.5 | | | | |
| Informant's sex | Female | 81 | 36.3 | | | | |
| | Male | 142 | 63.7 | | | | |
| Informant's highest level of education | Diploma | 34 | 15.3 | | | | |
| | Bachelor degree | 129 | 57.8 | | | | |
| | Master degree | 60 | 26.9 | | | | |
| Organization size (i.e., workforce size) | | | | 224.23 | 183.39 | | |
| Informant's managerial experience (years in current position) | | | | 6.15 | 4.68 | | |
| Informant competence 1: Knowledge of survey items[1] | | | | 5.84 | 1.02 | | |
| Informant competence 2: Understanding of survey items[1] | | | | 5.86 | 1.13 | | |
| Informant competence 3: Confidence in responses provided[1] | | | | 5.90 | 1.10 | | |
| Informant competence 4: Accuracy of responses[1] | | | | 5.95 | 1.02 | | |
| Procurement quality performance[2] | | | | | | 1.466 | 0.233 |
| Internal procurement audit[2] | | | | | | 0.428 | 0.652 |
| External procurement audit[2] | | | | | | 0.288 | 0.750 |
| Top management commitment[2] | | | | | | 1.281 | 0.280 |

[1] = The items were adapted from Essuman et al. (2021) and were rated on a seven-point rating scale: "strongly disagree (=1)" to "strongly agree (=7)"; [2] = ANOVA is used to test whether informant's position affects the substantive variables.

of the sample and the key informants are shown in Table 1. A t-test result indicates that workforce size was statistically indifferent between early respondents and late respondents, suggesting that non-response bias may not describe the data (Essuman et al., 2021).

The majority of the key informants are procurement managers (57.0%) while the remaining are either top executives (CEO/managing director) (13.5%) or internal audit officials (29.5%). While these informants are likely to be knowledgeable about their organization's procurement and audit activities, their perceptions may differ (Flynn et al., 2018). Accordingly, we examined whether their position explains the data using ANOVA. The results show that procurement quality performance, internal and external procurement audits, and TMC do not differ significantly across the informant groups (Table 1). Moreover, the informants had held their positions for at least 6 years and also exhibited high informant competence characteristics (Table 1; Essuman et al., 2021).

## *Questionnaire development and measurement items*

We developed a preliminary version of the survey questionnaire based on prior studies and sent it to three senior audit staff, two experienced procurement practitioners, and two academics with expertise in public procurement issues for review. This exercise allowed us to revise the questionnaire to improve item face validity, clarity, and contextual appropriateness while eliminating sensitive content. Additional procedural remedies were deployed in the main survey to reduce common method bias (Podsakoff et al., 2012): a cover letter was used to explain the academic nature of the study and to guarantee respondent anonymity to reduce social desirability bias; different scale formats were used to evaluate the measures for the predictor, moderator, and outcome variables to reduce acquiescence biases. Further, to reduce consistency motif and illusory correlation biases, we introduced other items in the questionnaire to temporarily separate the measures for the predictor and outcome variables, and additionally removed pieces of information that might give clue about the hypothesized relationships in the study. The final measures are detailed in Table 2 and are further described as follows:

### *Internal and external procurement audits*

Previous studies have operationalized the audit construct differently (Turetken et al., 2019). For example, the construct has been measured using dummy data to capture whether or not an audit has been done during a period of interest (e.g., Farooq & Shehata, 2018), or using count data to capture the number of auditor relationships the auditee has (e.g., Ghosh, 2007). Consistent with our characterizations, we operationalized internal audit and external audit in terms of the extent to which the auditee's procurement issues (e.g., budget, transactions) are audited by internal auditors and external auditors, respectively. Specifically, we

**Table 2.** Details of measures and validity and reliability results.

| Construct/measures/composite reliability (CR)/average variance extracted (AVE)/Cronbach alpha (CA). | Loadings (t-values) |
|---|---|
| ***Internal audit***[1] (CR = 0.857; AVE = 0.601; CA = 0.834). *To what does each of the following characterize your organization?* | |
| The internal audit function reviews procurement budgets and plans | 0.822(Fixed) |
| The internal audit function monitors procurement activities regularly | 0.705(10.86) |
| The internal audit function insists on strict compliance with procurement policies and ethics | 0.740(11.50) |
| The internal audit function ensures that weaknesses in the procurement process are addressed | 0.828(12.96) |
| ***External audit***[1] (CR = 0.861; AVE = 0.610; CA = 0.840). *To what does each of the following characterize your organization?* | |
| External audit is conducted annually in my organization | 0.708(Fixed) |
| Value-for-money audit is conducted annually in my organization | 0.725(9.96) |
| External auditors scrutinize all procurement transactions in my organization | 0.889(11.65) |
| Overall, external auditors' examination of procurement activities is comprehensive | 0.790(10.78) |
| ***Top management commitment***[2] (CR = 0.900; AVE = 0.691; CA = 0.892). *Our top management . . .* | |
| Consider procurement to be a vital part of our corporate strategy | 0.823(Fixed) |
| View procurement issues as important | 0.851(14.65) |
| Ensure strict implementation of procurement audit recommendations | 0.811(13.67) |
| Show commitment toward releasing resources for improving procurement functions | 0.840(14.32) |
| ***Procurement quality performance***[3] (CR = 0.917; AVE = 0.736; CA = 0.908). *How would you rate the procurement function's performance in your organization over the past 12 months in terms of . . .* | |
| Buying the right goods/materials to work with? | 0.884(16.53) |
| Receiving goods/materials in the right condition? | 0.765(13.44) |
| Procuring goods/materials/services that meet end-user needs? | 0.934(18.34) |
| Receiving goods/materials/services that meet specifications? | 0.841(Fixed) |

[1] =Each item was rated on a 7-point scale: "to no extent (=1)" to "to the largest extent (=7)"; [2] = Each item was rated on a 7-point scale: "strongly disagree (=1)" to "strongly agree (=7)"; [3]Each item was rated on a 7-point scale: "very poor (=1)" to "very good (=7)".

generated four items to measure internal audit (e.g., The internal audit function reviews procurement budgets and plans; The internal audit function monitors procurement activities regularly). Four items were also used to measure external audit (e.g., External auditors scrutinize all procurement transactions in my organization; Overall, external auditors' examination of procurement activities is comprehensive). Using a seven-point (i.e., "to no extent (=1)" to "to the largest extent (=7)"), the informants indicated the extent to which the items characterize their organizations.

### *TMC*

We adapted four items (e.g., Our top management view procurement issues as important; Our top management consider procurement to be a vital part of our corporate strategy) from extant literature (e.g., Brandon-Jones & Knoppen, 2018; El-Kassar & Singh, 2019) to measure TMC using a seven-point scale ranging from "strongly disagree (=1)" to "strongly agree =7)". The items reflect the extent to which an organization's top managers demonstrate strategic procurement orientation and support for the procurement function (Brandon-Jones & Knoppen, 2018; Essuman et al., 2021).

### *Procurement quality performance*

Four items were adapted from previous research to measure this construct (e.g., Devaraj et al., 2012; Yeung et al., 2015). Based on a seven-point scale that ranged from "very poor (=1)" to "very good (=7)", the informants rated the performance of their procurement function in four areas: procuring the right items, obtaining supplies in the right condition, procuring items that meet end-user needs, and receiving supplies that meet specifications.

### *Control variable*

Organization size may covary with budget size and complexity of procurement activities. However, information about the organizations' procurement budgets was not accessible. To control for the potential influence of organization size, we considered workforce size (Balaeva et al., 2021; Essuman et al., 2021).

## Analyses and results

### *Measure validity and reliability assessment*

We validated the study's measurement indicators using covariance-based confirmatory factor analysis (CFA) in LISREL 8.8 (Hair et al., 2019) (Table 2). Using maximum likelihood estimator, we analyzed a multi-CFA model (Model 1), allowing us to assess the measurement properties of the indicators simultaneously (Bagozzi & Yi, 2012). Our theoretically specified four-factor CFA model fits the data: $\chi^2$ = 231.59, DF = 98, normed $\chi^2$ = 2.363, RMSEA = 0.078, NNFI = 0.943, CFI = 0.953, SRMR = 0.056 (Bagozzi & Yi, 2012; Hair et al., 2019). All factor loadings are above 0.70 and significant at 1.00%. Additionally, the composite reliability, Cronbach's alpha, and average variance extracted scores for each construct are above their minimum cut-off values of 0.60, 0.70, and 0.50, respectively, demonstrating the reliability and convergent validity of the indicators (Bagozzi & Yi, 2012; Hair et al., 2019). Furthermore, all average variance extracted scores are far greater than the shared variances between any pair of constructs, demonstrating discriminant validity (Hair et al., 2019).

### Common method bias assessment

We statistically examined whether common method bias describes our self-reported survey data (Podsakoff et al., 2012). We utilized CFA procedures to compare our theoretical measurement model (Model 1) with several alternative measurement models (Podsakoff et al., 2012). First, we compared Model 1 with a method-only model (Model 2), in which all measures were specified to load onto a single latent factor. Results show that Model 2 is significantly worse than Model 1 ($\Delta\chi^2$ = 1,420.97, $\Delta$DF = 6, $p < .01$) and does not fit the data: $\chi^2$ = 1652.56, DF = 104, normed $\chi^2$ = 15.89, RMSEA = 0.259, NNFI = 0.567, CFI = 0.625, SRMR = 0.186. Given the conceptual similarity in some of the item wordings for internal and external audits, we compared Model 1 to a three-factor model (Model 3), in which the items for internal and external audits were assumed to have a common underlying factor: $\chi^2$ = 708.61, DF = 101, normed $\chi^2$ = 7.016, RMSEA = 0.165, NNFI = 0.816, CFI = 0.845, SRMR = 0.126. While Model 3 shows some improvement over Model 2, it is significantly worse than Model 1 ($\Delta\chi^2$ = 477.02, $\Delta$DF = 3, $p < .01$). Lastly, we compared Model 1 with a two-factor model (Model 4), in which the items for internal audit, external audit, and TMC were loaded onto a single latent factor, while procurement quality performance was specified to load onto its theoretical items. Results show that Model 4 is significantly worse than Model 1 ($\Delta\chi^2$ = 1,001.63, $\Delta$DF = 5, $p < .01$) and does not fit the data ($\chi^2$ = 1233.22, DF = 103, normed $\chi^2$ = 1,197.301, RMSEA = 0.222, NNFI = 0.691, CFI = 0.735, SRMR = 0.176). Overall, these results indicate that the variations in the data for the study's measurement items are explained by their respective constructs rather than common unmeasured latent factors. Moreover, past research indicates that empirical results for theoretically grounded contingency effect models, such as Figure 1, are unlikely to be biased by common method issues (Podsakoff et al., 2012).

### Hypothesis testing

Table 3 presents the descriptive statistics and correlations results. We tested our hypotheses using Hayes' PROCESS for SPSS (2.16) as it permits researchers to test the statistical significance of moderation effects at specific levels of the moderating variables and helps in visualizing such effects (Hayes, 2018). In essence, we estimated a moderated regression model which simultaneously incorporates the predictors, moderating variable, and their interaction terms (Aguinis et al., 2017). Specifically, we estimated three models that include the main effect variables (i.e., internal audit [IA]; external audit [EA]; TMC) and the interaction effect terms (i.e., IA×TMC; EA×TMC) (Aguinis et al., 2017): Model 1 included "IA×TMC"; Model 2 included "EA×TMC"; Model 3 included both interaction terms. Given *H1a-b*, all variables used in creating the interaction terms were first mean-centered (Aguinis et al., 2017). As displayed in Table 4, all three models reveal that both internal and external audits have significant positive relationships with procurement quality performance, supporting *H1a* and *H1b*.

Additionally, Model 1 and Model 3 reveal that "IA×TMC" has a significant positive effect on self-reported procurement quality performance, supporting *H2a* while Model 2 and Model 3 indicate that "EA×TMC" does not significantly affect self-reported procurement quality performance, rejecting *H2b*. To generate an in-depth understanding of the nature of the moderating role of TMC, a post-hoc analysis involving the Johnson-Neyman technique was conducted (Hayes, 2018). Results displayed in Figure 2(a) generally suggest that the effect of internal audit on self-reported procurement quality performance increase with increases in TMC, but at low and high levels of TMC (i.e., 2.69 ≥ TMC ≥ 5.28), internal audit has significant

**Table 3.** Descriptive statistics and correlations.

| Variables: | | Mean | SD | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| 1. | Procurement quality performance | 4.22 | 1.390 | – | | | | |
| 2. | External audit | 4.45 | 1.174 | 0.293** | – | | | |
| 3. | Internal audit | 5.01 | 1.081 | 0.382** | 0.239** | – | | |
| 4. | Top management commitment | 5.75 | 1.027 | 0.359** | 0.217** | 0.208** | – | |
| 5. | Organizational size | 5.20 | 0.619 | 0.061 | −0.008 | 0.060 | 0.046 | – |

*p < 0.05 (2-tailed); **p < 0.01 (2-tailed).

**Table 4.** PROCESS results and hypothesis evaluation.

| | Hypothesis | Unstandardized coefficient (t-value) | | | Conclusion |
|---|---|---|---|---|---|
| | | Model 1 | Model 2 | Model 3 | |
| Direct effect paths[1]: | | | | | |
| Internal audit (IA) | H1a: + | 0.360(4.727) | 0.360(4.542) | 0.361(4.692) | Supported |
| External audit (EA) | H1b: + | 0.162(2.291) | 0.194(2.673) | 0.162(2.287) | Supported |
| Top management commitment (TMC) | | 0.422(5.188) | 0.368(4.350) | 0.421(5.065) | |
| Organizational size | | −0.014(−0.104) | 0.068(0.518) | −0.013(−0.101) | |
| Conditional direct effect paths[1]: | | | | | |
| IA × TMC | H2a: + | 0.257(3.966) | | 0.258(3.891) | Supported |
| EA × TMC | H2b: + | | 0.006(0.083) | −0.007(−0.099) | Rejected |
| $R^2$ | | 0.305 | 0.256 | 0.305 | |
| F | | 19.027*** | 14.940*** | 15.785*** | |

[1]Dependent variable is self-reported procurement quality performance.
[2]All regression coefficients are evaluated at t-value ≥ 1.96 (5%, 2-tailed test).
[3] ***Model is significant at 0.1%.

negative and positive effects on self-reported procurement quality performance, respectively. Additional results indicate that the effect of external audit on procurement quality performance appears to increase with increases in TMC, but only at the high levels of TMC (i.e., TMC ≥ 5.28) does external audit have a positive and significant effect on procurement quality performance (Figure 2b).

## Discussion

### *Theoretical contributions and implications*

In considering that low procurement performance in public procurement tends to result from corrupt and opportunistic behaviors (Balaeva et al., 2021; OECD, 2016), we draw on public audit literature and the agency theory to shed light on how procurement audit explains procurement quality performance. Specifically, recognizing that simultaneous consideration of types of audits and the organizational conditions under which they work is critical to clarifying the performance effects of procurement audit (Sabet, 2020), we developed and tested a contingency model to examine how internal and external aspects of procurement audit relate to procurement quality performance under varying conditions of TMC. Survey data from Ghana largely support our model that these audit types as well as their interactions with TMC significantly account for the variability in self-reported procurement quality performance. Along this line, we advance the underdeveloped knowledge of the determinants of procurement quality performance (Anin et al., 2020), especially in the public procurement context (Patrucco et al., 2019).

Additionally, we enrich the sketchy literature on the interface between public sector audit and procurement (Balaeva et al., 2021; Sabet, 2020) in an important way. Despite the wide application of audits in public organizations, empirical studies on the benefits of audits in the public sector are now gaining interest (Raudla et al., 2016). Such studies are currently limited to financial and performance audits (Bonollo, 2019; Hay & Cordery, 2021). We extend this line of inquiry to the public procurement function, and by demonstrating how the magnitude and direction of associations between procurement audit and procurement quality performance vary depending on the type of procurement audit (internal versus external) and across various TMC conditions, we contribute to discussions and help elucidate the ambiguous conclusions in the existing literature (Sabet, 2020). We found that not only does internal audit have a stronger positive association with self-reported procurement quality performance, but also the magnitude and direction of this association are more sensitive to variations in TMC. Importantly, we found that internal procurement audit has both significant positive and negative associations with self-reported procurement quality performance when TMC is below and above average levels, respectively. Internal audit, due to its direct and close monitoring mechanisms, can be more efficacious. However, in the absence of TMC, a greater degree of internal audit can promote adversarial responses by procurement officials and limit learning (Raudla et al., 2016), especially in institutionally void countries, undermining procurement quality performance (Balaeva et al., 2021).

The study's results are consistent with the principles of agency theory that recognize internal and external procurement audits as important governance tools that facilitate responsible and efficient management of public resources (Al-Matari et al., 2017; Hay & Cordery, 2021). However, our analysis of the moderating role of TMC clarifies the boundaries of the logic of the agency theory for linking procurement audit to procurement quality performance. The results support the contingency-based argument that internal and external procurement audits may not always benefit procurement quality performance

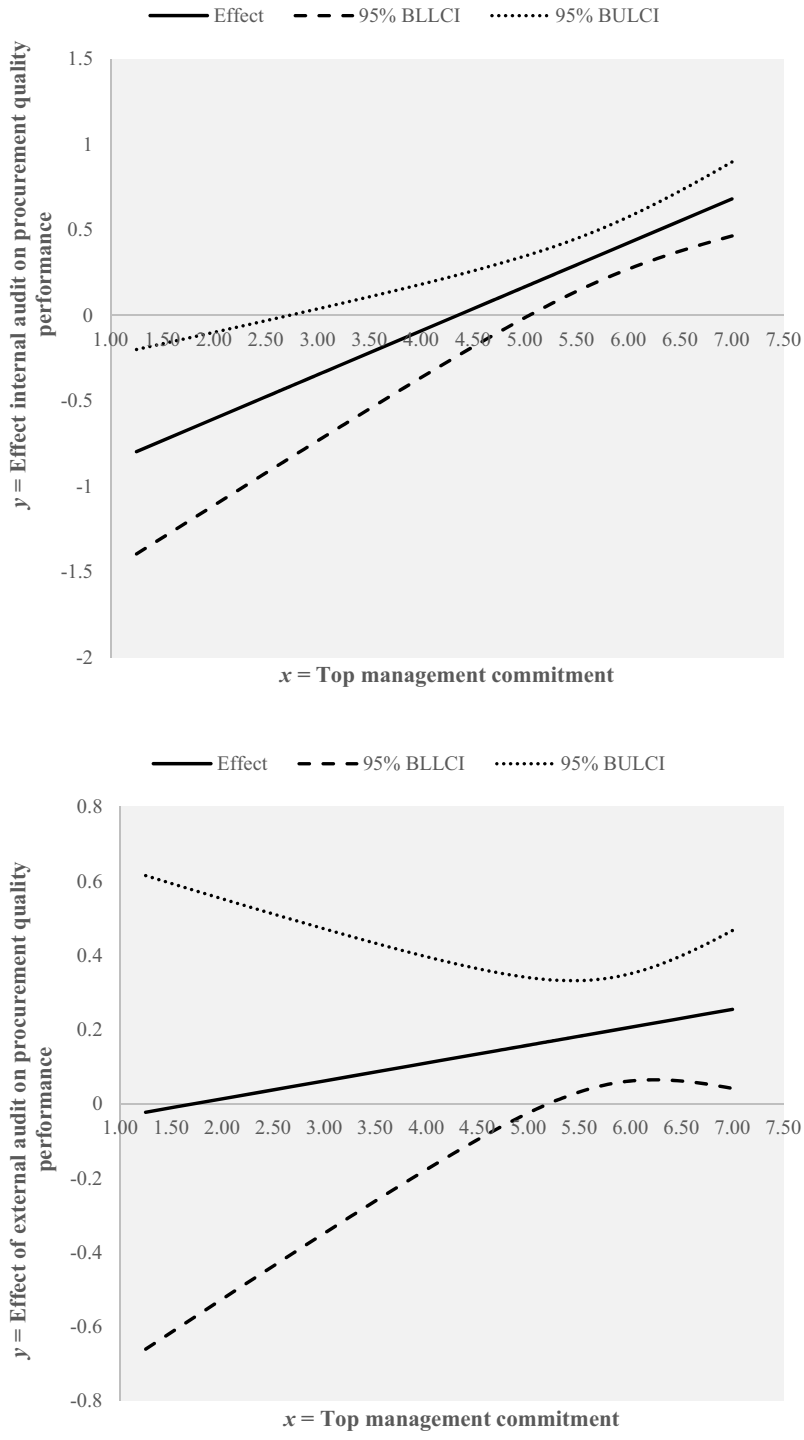


**Figure 2.** (a,b) Effect of internal audit on procurement quality performance at varying conditions of TMC. Notes: 1. BLLCI = bootstrap lower-level confidence interval; BULCI = bootstrap upper-level confidence interval.2. The number of bootstrap samples for bias-corrected bootstrap confidence intervals is 5000.*3. For* 2.69 ≥ **x** ≥ 5.28, **y** is statistically significant.*4. For*x ≥ 5.28, *y* is statistically significant.

(Donaldson, 2006; Van de Ven et al., 2013). In support of the literature that TMC is important for driving procurement quality performance (Essuman et al., 2021; Knoppen & Sáenz, 2015), the study's results additionally indicate that TMC complements procurement audit in improving self-reported procurement quality performance.

In conclusion, our contingent-agency perspective to explaining and unraveling the complexities regarding

the relationship between procurement audit and procurement quality performance responds to the concern about the under-theorization of public sector audit in academic research (Hay & Cordery, 2021; Sabet, 2020) and the calls for integrative theoretical lenses to generate richer insights (Bonollo, 2019). Insights from this study suggest that our understanding of the performance consequences of pubic audit activity can be enhanced from a contingency perspective that recognizes performance outcomes as conditional upon types of audits and organizational situations (Sabet, 2020).

### *Practical implications*

A key message from this study is that public organization leaders should match their emphasis on procurement audit with a commitment to strategic procurement issues to realize improved procurement quality performance results. Such commitment integrates procurement officials' interests and views into the overall strategic direction of the organization and engenders their commitment to best procurement practices. It additionally provides necessary resources for developing the procurement function and ensures that audit recommendations are implemented in ways that benefit strategic procurement outcomes.

Deepening and sustaining top management commitment to strategic procurement issues requires a reorientation and some structural changes within public organizations. Training programs can be used to educate leaders on strategic procurement issues, reduce structural gaps (e.g., power distance) between top executives and procurement officials and provide the necessary guidelines for top executives to align procurement strategy and goals with corporate ones.

### *Limitations and future research direction*

Our research has theoretical and methodological limitations. Theoretically, this study was interested in procurement quality performance and its determinants. However, our conceptual model appears useful for explaining other procurement performance outcomes such as efficiency performance, delivery performance, and innovation performance (see, Patrucco et al., 2016). In extending our model along this line, further studies can explore other internal and external moderators of procurement audit while incorporating more control variables such as budget size.

Due to practical constraints, we tested our hypotheses using self-reported survey data, which is primarily used in research focusing on micro- and organization-level audit variables (Bonollo, 2019) and procurement variables (Balaeva et al., 2021). However, because public procurement is often characterized by corruption (OECD, 2016), there is a potential for social desirability bias to partially explain the main effect of procurement audit on procurement quality performance but not the moderating effect of TMC (Podsakoff et al., 2012). As presented, we followed recommended procedural and statistical remedies to address such concerns, and while the study's results are consistent with our contingent-agency theorizations, we also note that it is challenging to eliminate common method bias issues in self-reported surveys (Podsakoff et al., 2012). Multiple sources of data and or longitudinal surveys should be explored in future studies (Podsakoff et al., 2012). In particular, longitudinal surveys can be used to test our conceptual model to generate causal inferences. Finally, corruption and irregularities in public procurement are common in most developing countries (Ibrahim et al., 2017; The World Bank, 2021), which offers an opportunity for replicating this research in other developing economies.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Data availability statement

The data for the study is available upon request.

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