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From consortium tendering to SMEs' participation in public procurement markets: do procedural capabilities intervene?

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ABSTRACT

This study examines the effect of consortium tendering (CST) on the participation of SME in public procurement markets (PPM) with a particular focus on the mediating role of procedural capabilities (PRC). Data collection was done using a structured cross-sectional questionnaire survey that was randomly distributed to 283 SMEs within the context of Tanzania. The proposed model hypotheses were tested using Hayes PROCESS macro. The study results showed a significant positive effect of CST on SME's PRC and their engagement in PPM. Further, PRC revealed a significant positive effect on SME participation in PPM. The notable finding of the study is that PRC serve as a mechanism through which CST influences SME participation in PPM. Accordingly, the study suggests designing digital platforms that can connect SMEs with large companies and their peers, offer specific training and mentorship programmes on the aspect of CST and the procedural nature of PPM. The study makes a novel contribution to literature on public procurement and competitiveness by integrating insights of CST and PRC to explain SMEs' involvement in PPM. The study findings hold relevance for policymakers, oversight authorities and support institutions seeking ways to enhance strategies towards inclusive participation of SMEs in PPM.

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1. Introduction

The participation of small and medium-sized enterprises (SMEs) in public procurement markets (PPM) is an area of interest in designing policies and development agenda. This is because SMEs are considered the engine of economies. They make a substantive contribution to innovation, employment, gross domestic product (GDP) and economic stability (Hoekman & Taş, 2022; Nemec & Džupka, 2021). In developing economies such as Tanzania, SMEs make up 95% of all formal sector enterprises, an estimated 65% of total employment and contribute about 40% of GDP (United Republic of Tanzania, 2022; World Bank, 2023). To SMEs, participating in PPM can thus present a revenue-raising opportunity, a market-expansion strategy, and a platform for economic growth (Israel & Kazungu, 2019; Patil, 2017). This is attributed to the fact that PPM absorbs a substantial share of government expenditure. As of 2021, global public procurement expenditure stood at US $13 trillion, which translates to 15% of GDP (World Bank, 2021). Eritrea in Africa spends a substantial amount on public procurement, which stood at 33% of GDP. Angola in Africa ranks second after Eritrea, spending 26% of its GDP on public procurement. In Tanzania particular, the government spent up to 70% of the country's annual fiscal budget (Changalima et al., 2023; Siwandeti et al., 2025), equivalent to 6% of GDP (OCP, 2020) on the procurement of goods, works and services.

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SMEs' participation in PPM embody to the extent to which SMEs are able to access, compete for, win, and successfully execute public sector contracts for the supply of goods, services, and works (Di Foggia et al., 2025; Flynn & Davis, 2017; Rejeb et al., 2024. Notwithstanding the potential role of SMEs in economies and the lucrative nature of PPM, SMEs often face considerable barriers that restrict their participation and success in PPM. In 2023, the overall global participation rate of SMEs in PPM stood at 18% (World Bank, 2023), despite making 90% of businesses (World Bank, 2022). In Tanzania particular, where this study was conducted, SMEs' participation rate in PPM is estimated 4%, ranging from 3% for small enterprises to 6% for medium-sized enterprises (World Bank, 2023). This is significantly lower than 18% of large firms (World Bank, 2023). A multitude of barriers have been shown to prevent SMEs from utilizing such opportunities and participating in PPM in an efficient manner. Some of these barriers include PPM being a bureaucratic process, lack of managerial/technical capacity, rigorous qualifications and certifications, and competition offered by large firms (Akenroye et al., 2020, 2024; Mutangili, 2024). Other barriers include limited access to information about procurement opportunities, limited financial capability, and limited experience in handling large-scale government contracts (Ismail & Changalima, 2022; Mahuwi & Israel, 2023; Nemec, 2024).

According to the Dynamic Capability View (DCV), the capacity to integrate, develop and reconfigure internal and external capabilities determine the competitive advantages and successful performance of business firms in a volatile business environment (Lütjen et al., 2019; Teece et al., 1997). In the realm of public procurement, consortium tendering (CST) or joint bidding (JB) is highly considered a prominent approach via which SMEs may develop and restructure their internal and external competencies to create competitive advantages and enhance participation (Bazan-Bulanda, 2017; Godlewska, 2018; Szydlo, 2018). CST is a bidding approach where two or more legal independent companies combine their efforts in order to offer a particular contract (Godlewska, 2018). This is especially critical to SMEs which in most cases do not have sufficient financial, technical or managerial capability to make individual bids on large contracts. In the procurement of goods, CST is especially suitable if the requirements are of large quantities, specifications are technical and complex in nature, and the value is high (Glas & Eßig, 2018; Ilić, 2024; Puksas et al., 2025). Besides, CST is also applicable in case of supply arrangements are beyond the capability of an individual supplier, such as a framework agreement (Arosa et al., 2025). Through CST, SME suppliers can share technical skills and financial resources and to manoeuvre successfully in the dynamic and competitive landscape of PPM. Such approach, according to Reijonen et al. (2022) and Israel (2025), enables SME suppliers to overcome size, technical, knowledge, resources, production and supply capacity-related constraints that hinder their engaging in PPM. It can also help SMEs scale up their competitiveness and capabilities, undertake larger or more complex procurement projects whilst meeting integrated supply capacity, quality standards and after-sales services.

Studies linking CST to SMEs' participation in PPM are context specific and offer inconclusive and contradicting results. While Smith et al. (2025), Szydlo (2018) and Fayos et al. (2022) in Poland, USA and Spain revealed CST as a means of obtaining public contracts, Reijonen et al. (2022) in Finland reported the lack of association between CST and SME participation in PPM. Given the low participation rate and inconsistent findings of prior empirical studies, there remains an opportunity to examine 'how' CST can translate into enhanced SMEs' participation in PPM. According to Hayes (2022), the 'how' question in business and social research is addressed using mediation analysis. This approach provides the underlying mechanism through which a predictor variable influences an outcome variable. Accordingly, this study is grounded on the premise that the influence of CST on SMEs' participation in PPM highs on their ability to translate the potentials of CST. These include capabilities to interpret tender specifications, compliance needs, bid submission procedures, and contract management requirements. In the context of public procurement, procedural capabilities (PRC) are seen to be the mechanism through which SMEs can translate the potential of CST for effective participation in PPM. Aligned with DCV, robust PRC can help SMEs convert pooled resources and shared expertise into compliant, competitive, and strategically align bids within PPM. As such, the effect of CST on SMEs participation in PPM can be mediated by SMEs' PRC.

Despite growing scholarly attention to the antecedents of SME participation in PPM, several important gaps remain. First, no evidence-based empirical studies addressing how CST and PRC collectively impact SME engagement in PPM using mediation analysis. Prior empirical studies in this domain are centred on assessing the direct effect of CST (Akenroye et al., 2022; Puksas et al., 2025; Reijonen et al.,

2022) and PRC (Flynn & Davis, 2017) on SME participation in PPM, often producing mixed and inconclusive findings. Second, few studies have assessed the mediation effect of PRC, primarily focusing on the link between market logics, firm size and SME's involvement in PPM (Flynn, 2017) in developed countries. Third, the DCV has not been employed to explore the dynamic interplay between CST, PRC and SME participation in PPM, particularly in emerging economies like Tanzania, where SMEs face unique challenges. This study addresses these gaps and offers new insights, examining the mediating role of PRC in the relationship between CST and SME participation in PPM using the theoretical lens of DCV in the context of Tanzania. In addition, the study examines whether CST and PRC contribute individually to SME participation in PPM. The study is motivated by the low participation rate of SMEs in PPM, and the fact that CST helps SMEs address the procedural-related challenges for effective participation in PPM. The study is particularly timely, considering the increasing emphasis on inclusive economic growth and sustainable development of SMEs in global and national policy agendas (World Bank, 2021; United Republic of Tanzania , 2023). The study is guided by the following three (3) central specific research questions.

RQ1. What impact does CST have on SMEs' PRC and participation in PPM?
RQ2. Does PRC have a significant direct effect on SMEs' participation in PPM?
RQ3. How does PRC mediate the effect of CST on SMEs' participation in PPM?

The study contributes to the existing literature on SME involvement in PPM in several ways. Unlike prior studies that have focused on the direct effect of CST (Akenroye et al., 2022; Puksas et al., 2025; Reijonen et al., 2022), this study offers novel insight, presenting PRC as a strategic mechanism through which CST is translated into enhanced participation of SMEs in PPM. This approach provides policymakers and managers of firms with a better insight into the manner in which SMEs are able to build the operational and compliance-related resources and capabilities needed to overcome the complex process of public procurement. Theoretically, the study extends the application of the DCV by demonstrating how SMEs can build and reconfigure PRC through CST to improve their competitiveness in regulated PPM. By focusing on the Tanzanian public procurement context, the study contributes context-specific evidence from a developing economy setting, which remains underrepresented in the existing literature on SME participation in PPM.

2. Literature review and hypotheses development

2.1. Dynamic capability view (DCV)

The DCV provides a theoretical base for this study to understand how CST can interact with PRC in enabling SMEs' participation in PPM, in line with prior empirical studies on firms' competitive advantages and performance (Israel & Mwenda, 2024; Rutainurwa et al., 2024; Salisu & Abu Bakar, 2020). The theory is an extension of the Resource-Based View (RBV), generally stating that firms possess unique tangible resources such as physical assets and finance, and intangible resources such as knowledge and capabilities (Barney, 1991). Precisely, the DCV contends that merely possessing unique resources and capabilities cannot accord a firm the opportunity to create a competitive advantage and achieve superior performance (Teece et al., 1997). Rather, it highlights the capacity to integrate, reconfigure and develop internal and external resources and capabilities of firms in order to attain prolonged competitive edge, efficiently sense and seize opportunities and improve its performance (Lütjen et al., 2019; Teece et al., 1997). Besides, the theory underlines the need to be dynamic and flexible, instead of depending only on available resources and capabilities (Lütjen et al., 2019).

Within the framework of DCV, CST can serve as a mechanism through which SMEs can build, integrate and reconfigure their internal and external resources to enhance their PRC for inclusive participation in PPM. By engaging in CST, SMEs can access financial resources and knowledge related to procurement processes, tender preparations, compliance routines and contract management (Lu et al., 2021; Puksas et al., 2025). Such resources and knowledge have been regarded as the prerequisite capabilities for participation in PPM (Flynn & Davis, 2017; Namagembe et al., 2021). Once leveraged, CST enables SMEs to better adapt to procedural requirements, sense and seize procurement opportunities, and navigate

complex business environments of PPM. This orientation aligns with the proposition of DCV (Teece et al., 1997), which necessitates continuous adaptation and reconfiguration of a firm's internal and external processes and capabilities to meet the evolving demands of the industry. Based on this, the study employs DCV to explain how CST contributes to improved SME-PRC and inclusive participation and success in PPM.

2.2. Consortium tendering and SMEs' procedural capabilities

Typically, when SMEs engage in consortium tendering (CST) they are more likely to foster their procedural capabilities (PRC) needed to navigate effectively in the PPM. Consequently, researches reveal a considerable positive role of CST on the improvement of SMEs' PRC. Empirical studies by Di Mauro et al. (2020) and Reijonen et al. (2022) in Finland and Canada opine that participating in CST empowers SMEs with competencies to address PRC-related issues in accessing and managing procurement tenders. This is because CST enables access to resources, technical knowledge and learning opportunities that individual SME would otherwise not have. As also noted by Akenroye et al. (2022) in the United Kingdom, CST, especially with large experienced firms, exposes SMEs to more advanced organisational practices and knowledge-sharing functions. In the scope of PPM, such resources and knowledge enhance the capability of SMEs to align with the rules of procurement, the tender specifications and the administrative requirements. Consistent with the theoretical premise of DCV (Teece et al., 1997), CST can assist SMEs to optimize their PRC, meet eligibility requirements of government procurement, compose competitive bids and learn more about the intricate tendering process in PPM. Contrarily, the role of CST as an antecedent of PRC in developing country like Tanzania has not yet been documented (Di Mauro et al., 2020; Nemec, 2025). This has prompted the necessity to test the proposed below hypothesis in Tanzanian context to enhance the validity of global generalisations.

H1. CST has a positive influence on the PRC of SME suppliers.

2.3. Consortium tendering and SMEs' participation in PPM

Literature offers conflicting insights on the relationship between CST and SME participation in PPM. In Canada, an empirical study by Di Mauro et al. (2020) found that CST was positively correlated with the success of SMEs in PPM. Typically, CST enables the SMEs to share various resources and strengths including financial ability, technical know-how, managerial knowhow and experience in the market. This strategy, as also noted by Akenroye et al. (2022), Jama and Muloosi (2025) and Lu et al. (2021), enhances SMEs' ability to sense and seize procurement opportunities, foster their competitiveness and chances of success in PPM. Moreover, CST helps SME to share risks and bridge their capability gaps that usually restrict their competitiveness in large and complicated tenders. As DCV implies, possession of resources does not enhance the competitive advantage and performance of a firm, but rather the capacity to integrate and re-organize such resources in a manner that causes value (Teece et al., 1997). Unlike the theoretical posture of DCV and earlier empirical results, Reijonen et al. (2022) in Finland found insignificant positive effect of CST and SME participation in PPM. These inconsistencies could be attributed to variations in the application of CST and the market structure of public procurement across countries (Di Mauro et al., 2020; Lu et al., 2021). Such variations highlight the need to further examine the relationship between CST and SME participation in PPM in emerging economy like Tanzania for fair global generalization. Based on this, it is hypothesised that:

H2. CST has a positive influence on the participation of SME suppliers in PPM.

2.4. Procedural capabilities and the participation of SMEs in PPM

Procedural capabilities (PRC) embody firm's ability to understand, implement and consistently comply with procedures, rules and standardised processes that govern public procurement (Flynn, 2017). They represent practical competences such as the ability to understand and satisfy tender qualifications, evaluation criteria and manage awarded contracts (Changalima et al., 2023; Santos & Cabral, 2022). Studies reveal that possessing strong PRC enables firms to navigate the complex environment of PPM. In Ireland, an empirical study by Flynn and Davis (2017) argued that firms that continuously develop their PRC

maintain a high level of competitiveness in sensing and seizing tenders and managing them more effectively. This is further supported by Santos and Cabral (2022) and Namagembe et al. (2021) in Brazil and Uganda who also noted that effective PRC ensures SMEs' compliance with predefined procurement rules, enables them to respond adequately to tender calls, and meet tender qualification and evaluation criteria. These arguments are consistent with theoretical suggestion of DVC (Teece et al., 1997), which emphasizes the significance of developing a firm's capabilities for betterment in a firm's competitiveness and performance. Accordingly, SMEs with robust PRC are better placed to fully utilize their internal and external resources and effectively succeed in the challenging task of competing in PPM (Flynn, 2017; Namagembe et al., 2021). However, PRC for engagement in PPM varies considerably across countries and sectors (Puksas et al., 2025; Smith et al., 2025). This versatility has led to the formulation of the following hypothesis to test whether PRC can be harmonised among SME suppliers in the Tanzanian context.

H3. PRC has a positive influence on the participation of SME suppliers in PPM.

2.5. The mediation role of procedural capabilities

Principally, CST operates as a strategic mechanism that can help SMEs build PRC needed to participate more competitively and consistently in PPM. In particular, CST exposes SMEs to external expertise, resources and best tendering practices needed for participating in PPM (Reijonen et al., 2022; Smith et al., 2025). Despite increased access to financial and technical competencies facilitated by CST, these competencies do not automatically translate into enhanced engagement in PPM. For SMEs to take advantage of CST for improved participation in PPM, they should demonstrate the abilities to interpret and implement tender process requirements in a logical and structured manner. Viewed from the DCV (Teece et al., 1997), SMEs with robust PRC can strategically translate the potential of CST into meaningful approach for satisfying the technical, regulatory and procedural requirements of PPM. PRC, as also noted by Puksas et al. (2025) and Changalima et al. (2023), grants SMEs the abilities to successfully preparing competitive tenders, meeting tender evaluation and qualification criteria, and effectively managing awarded contracts. In other words, the PRC provides the vital link that assists the SMEs in converting the efforts of CST into meaningful engagement in PPM. Notwithstanding these insights, empirical evidence on the mediating role of PRC in the relationship between CST and the participation of SME suppliers in PPM remains largely unexplored in the existing literature. Drawing on DCV (Teece et al., 1997) and prior studies (Flynn, 2017; Namagembe et al., 2021), the following hypothesis is proposed to examine whether PRC can translate CST into meaningful involvement of SME suppliers in PPM.

H4. PRC mediates the relationship between CST and SME participation in PPM.

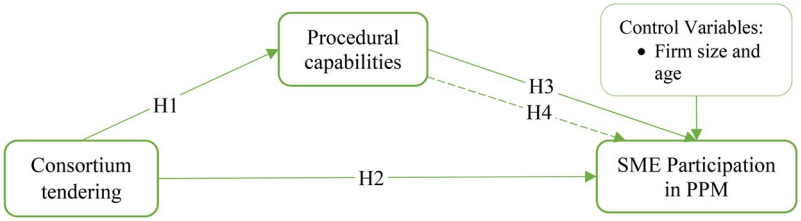
2.6. Conceptual framework

Figure 1 presents the conceptual model for this study, illustrating the hypothesized relationships between CST, PRC and SMEs' participation in PPM. The model was developed based on the literature review and the research hypotheses formulated in the previous section. It proposes that CST serves as the foundation for both SMEs' PRC and their participation in PPM. Moreover, the model hypothesizes that PRC is positively related to SMEs' participation in PPM. Additionally, the model posits that PRC mediates the effect of CST on SMEs' participation in PPM. Firm size and age were also featured in the model as the control variables because they could have a substantial effect on the involvement of SMEs in PPM. Overall, the model indicates that the efficacy of CST in enhancing involvement of SMEs in PPM is achieved when they demonstrate robust PRC.

3. Research methodology

3.1. Research design and study area

A positivism research paradigm and cross-sectional research design were employed to justify the mediating role of PRC in the link between CST and participation of SME suppliers in PPM. The use of



Source(s): Figure created the authors.

Figure 1. Proposed research model. *Source(s)*: Figure created the authors.

positivism research paradigm fits well with this study because the authors sought to test and confirm the proposed model hypotheses using quantitative data (Eichelberger, 1989). On the other hand, a cross-sectional research design was preferred because the study aimed to collect data about a phenomenon in its current state, rather than tracking changes over time (Saunders et al., 2019). This research study was conducted in Dodoma, Arusha, Mbeya, Mwanza and Dar es Salaam regions of Tanzania. The regions were selected for the study based on three main reasons. First, the regions are the economic centres of Tanzania, which, in aggregate, account to 47.77% of all SMEs in the country (United Nations [UN], 2020). Second, PEs in these regions have consistently indicated different levels of participation of SMEs in the PPM, with only 2% encouraging exclusive participation (PPRA, 2021). Finally, each of the selected region represents a unique zone of the country. Dodoma represents the Central region, Arusha the Northern region, Mbeya the Southern Highlands region, Mwanza the Lake region, and Dar es Salaam the East and Coastal regions. These aspects make the areas chosen the most suitable and representative zones to assess how CST can engage with the PRC to affect the inclusion of the SME suppliers in PPM.

3.2. Sampling

The main unit of analysis used in the research was SME suppliers operating in the five study regions. SME suppliers were considered for the study because they account for lowest participation rate (13%), compared to other services (20%), consulting services (14%) and construction sector (13%) (Bas et al., 2019). Specifically, the study targeted SME suppliers who were already registered in the National e-Procurement System of Tanzania (NeST) before the data collection period. The reason to including SME suppliers who have already registered in the NeST was to capture the current state of the phenomenon being studied. Registering in NeST indicates an interest for these SMEs to actively engage in the government e-procurement system (Siwandeti et al., 2021). Consequently, they were thought to be in a position to give pertinent information with regard to the study variables. In particular, there were 2,717 registered SME suppliers in NeST across the five regions, as identified from the lists provided by the PPRA. The distribution was as follows: Dodoma (238), Arusha (296), Mbeya (310), Mwanza (323), and Dar es Salaam (1,550). Yamane's (1973) formula for a finite population was used to determine the minimum sample size of 349 SME suppliers from the total population of 2,717 (see Equation 1). The estimated sample size of 349 was proportionally allocated to each region to ensure diversity, representation and to avoid bias in selecting SME suppliers for participation in the study. Subsequently, random sampling was employed to select SME managers from each enterprise as the units of inquiry.

$$n = \frac{N}{1 + N(e)^2} = \frac{2{,}717}{1 + 2{,}727(0.05)^2} = 349 \tag{1}$$

3.3. Data collection

A structured questionnaire survey with a set of closed-ended questions was used for data collection. The reason for adopting questionnaire survey as a method for data collection is because of its capability to

Table 1. Overview of sample characteristics.

Factors	Variables	Frequency	Percentages
Sex respondents	Female	149	52.65
	Male	134	47.35
Age groups	20–30 years	69	24.38
	31–40 years	102	36.04
	41–50 years	82	28.98
	51–6 years	70	24.73
	60 years and above	60	21.20
Academic qualification	Secondary education	91	32.16
	Diploma	73	25.80
	First degree	87	30.74
	Postgraduate	32	11.31
Operational experience	1–5 years	68	24.03
	6–10 years	88	31.10
	11–15 years	75	26.50
	16 years and above	52	18.37
Region of location	Dodoma	26	9.187
	Arusha	33	11.661
	Mwanza	36	12.721
	Mbeya	35	12.367
	Dar es Salaam	153	54.064
	Total	*283*	*100*
Number of employees	5–20	*218*	77.03
	21–40	65	22.97

Source(s): Table created by the authors.

deal with a diverse population and generate a large amount of data within a limited period of time (Saunders et al., 2019). The research questionnaires were disseminated among respondents using two methods. An email platform was used as an efficient means for disseminating questionnaires to distant respondents. However, questionnaires were administered in person to respondents who were in close proximity. At the outset, 349 questionnaires were disseminated among SME managers. After data processing and removal of non- responses, 283 useful responses were obtained. This represents an 81.09% response rate. Based on Wolf et al. (2013) and Hayes (2022) recommendations, the realised response rate met the necessary sample size requirement of 200 for confirmatory factor analysis (CFA) and testing mediation effects. Detailed information on the sample profile of the 283 respondents can be seen in Table 1. It shows notable variations in respondents' gender, age, academic qualifications, operational experience, firm size and region of location. Before proceeding with data collection, the questionnaire survey was pre-tested on six different SME managers and academia in the field. Changes and modifications were introduced in response to suggestions to ensure that the face and content validity of the questionnaire were maintained. Data collection took approximately seven months. It began from February 2025 and ended on August 2025.

3.4. Measurement of study variables

The measurement items used in this study were adapted from previous studies. The predictor variable (CST) was assessed with a 5-item scale of Crossley et al. (2016) and Albano et al. (2009). The measures focus on the ways in which SMEs can make good use of CST as a means of effective engagement in PPM. The mediation variable (PRC) also used a 5-item scale adapted from Flynn and Davis (2017) and Changalima et al. (2023), capturing key dimensions of tendering capabilities among SMEs. Finally, the outcome variable (participation of SMEs in PPM) was measured using a 5-item scale adapted from Tukamuhabwa and Namagembe (2023), Kibari and Muturi (2020), Flynn and Davis (2016), and Mwai and Senelwa (2018). All the measurement items were modified to reflect the general objective of the research, the nature of SME suppliers and the context of PPM in Tanzania. The complete list of measurement items and their sources are provided in Table 2. Each measure was rated on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). A pre-testing ($N = 56$) was conducted among SME suppliers to assess the reliability of the scale using Cronbach's alpha (α). Based on the analysis in Table 2, all the theoretical constructs (CST, PRC and PPPM) demonstrated reasonable reliability, with Cronbach's alpha above the recommended threshold of 0.7. In addition, firm size and age were included in the study as the control variables. Studies have shown that firm characteristics, particularly the size in terms of number of

Table 2. Study constructs and measures.

Theoretical constructs and indicators	Code	References
Consortium tendering (CST): $\alpha = 0.818$.		Crossley et al. (2016) and Albano et al. (2009).
• Our firm undertakes CST with peer SMEs to bid for common procurement tenders	Cst1	
• Our firm undertakes CST with large firms to bid for common procurement tenders	Cst2	
• CST offers a distinct competitive advantage for SMEs in public sector markets	Cst3	
• CST increases the odds of winning public procurement tenders for SMEs	Cst4	
• CST helps SMEs align their bidding strategy with project or contract requirements	Cst5	
Procedural capabilities (PRC): $\alpha = 0.725$.		Flynn and Davis (2017) and Changalima et al. (2023).
• Our firm has the ability to satisfy tender qualification criteria	Prc1	
• Our firm has the ability to understand tender evaluation criteria	Prc2	
• Our firm has the ability to effectively respond to tender evaluation criteria	Prc3	
• Our firm has the ability to receive feedback on submitted bids and contract award notices	Prc4	
• Our firm has the ability to successfully manage an awarded contract	Prc5	
Participation of SMEs in public procurement markets (PPM): $\alpha = 0.883$.		Tukamuhabwa and Namagembe (2023), Kibari and Muturi (2020), Flynn and Davis (2016) and Mwai and Senelwa (2018).
• Our firm is pre-qualified for public procurement opportunities	Ppm1	
• Our firm regularly seeks and searches for tender requests in public sector markets	Ppm2	
• Our firm consistently submits bids in response to public sector tender requests	Ppm3	
• Our firm has effectively secured contracts with the public sector through competitive bidding	Ppm4	
• Our firm has successfully supplied goods, works, and services to the public sector through the acquisition of tenders	Ppm5	

Source(s): Table created by the authors.

employees and age in terms of working experience, affect the likelihood of SMEs' participation in PPM (Flynn et al., 2015; Tukamuhabwa & Namagembe, 2023).

3.5. Common method variance (CMV)

To address potential issues of common method variance (CMV) arising from self-reported data, this study employed both procedural and statistical remedies. Procedurally, the questionnaire survey ensured respondent anonymity and clearly explained the purpose of the study to them. Besides that, the survey design separated the measurement items of independent, mediating, and dependent variables. These procedures aimed to reduce the likelihood of biased responses.

Statistically, Harman's single-factor test, as recommended by Podsakoff et al. (2003), was conducted to assess CMV. This involved performing an exploratory factor analysis (EFA) on all measured items of CST, PRC and participation of SME suppliers in PPM without rotation to determine whether a single factor accounted for most of the variance. The results showed that the first factor accounted for 34.6% of the total variance, which is considerably less than the 50% threshold. These results suggest that CMV was unlikely to have a significant impact on the study results.

3.6. Data analysis

Data analysis for this study was performed in four steps. In the first step, EFA was conducted for each construct to explore the underlying data structure and its dimensionality. The process follows Podsakoff et al. (2003) recommendations as measures of theoretical constructs were kept from different sources. Principal component analysis (PCA) with varimax rotation and Kaiser normalization was used to extract factor loadings and dimensions for each measure. In the second stage, items that met the criteria EFA (factor loadings ≥ 0.5 and eigenvalues > 1) were subjected into CFA to validate the latent variables and measure defining CST, PRC and PPM to ensure that they are correctly loaded. In the third phase, the Hayes PROCESS macro (Model 4) was employed to assess the mediation effect of PRC in the relationship between CST on SME suppliers' participation in PPM using the bootstrap procedure with 5000 iterations sample. The PROCESS macro is a robust and up-to-date tool for performing regression analysis that accommodates additional variables such as moderators, mediators and covariates (Hayes, 2022).

Table 3. EFA rotated analysis results.

	Components		
Factors	1	2	3
Cst1	0.851		
Cst2	0.723		
Cst3	0.762		
Cst4	0.893		
Cst5	0.712		
Prc1		0.718	
Prc2		0.711	
Prc3		0.854	
Prc4		0.743	
Prc5		0.853	
Ppm1			0.721
Ppm2			0.686
Ppm3			0.796
Ppm4			0.812
Ppm5			0.763
Cronbach's alpha	0.765	0.876	0.854
Initial Eigenvalues	7.746	3.618	1.785
Variance explained %	41.981	19.609	9.674
Total variance explained %	41.981	61.690	71.264

Extraction Method: Principal Component Analysis. *Source(s)*: Table created by the authors.

4. Study results

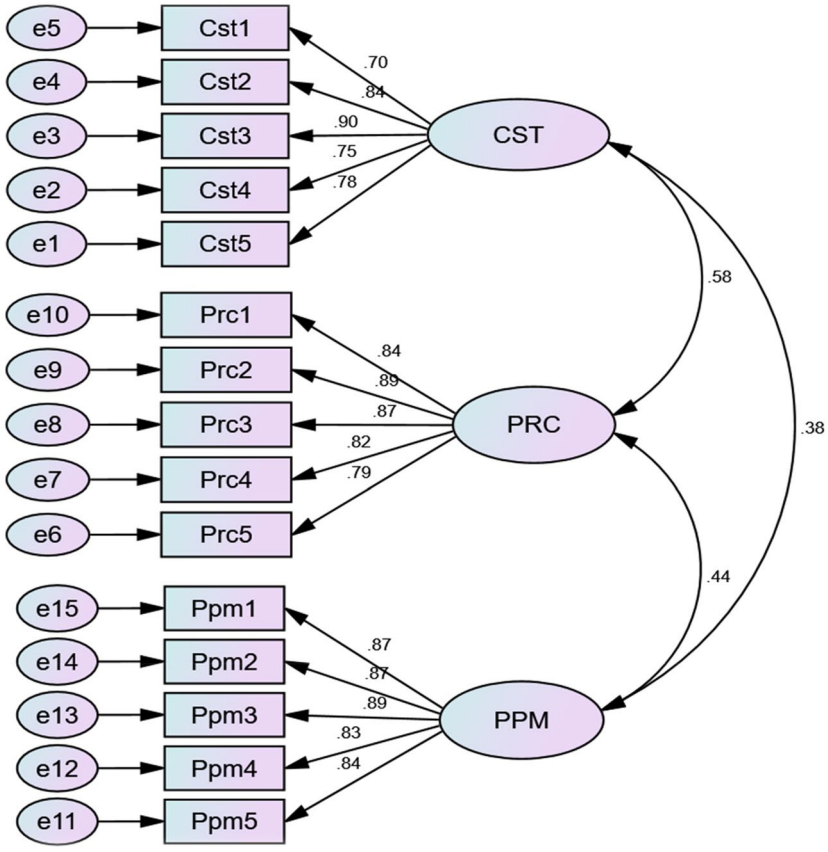
4.1. Reliability analysis

As explained in the data analysis section, an EFA was performed beforehand to examine the underlying data structure using Principal Components Analysis (PCA) with Varimax rotation (see Table 3). The procedure resulted in the extraction of three factors, which collectively accounted to 71.264% of the total variance explained. All factors showed a sufficient degree of internal reliability with Cronbach alpha values (α) of 0.765 to 0.876. The eigenvalues of each factor were higher than the recommended value of 1. In addition, the Kaiser-Meyer-Olkin (KMO) values, which signify the adequate sampling (Field, 2013), was 0.828, which is greater than the satisfactory level of 0.50. Besides, the test of sphericity based on Bartlett resulted in a significant finding with Chi-square = 1639.432 and degree of freedom (df) = 122 at $p = 0.003$. This also indicated the sample adequacy for performing EFA. The three theoretical constructs were captured using 15 items drawn from previous studies. No item was deleted, as each exhibited a factor loading greater than 0.5, hence were all retained for factor analysis.

4.2. Measurement model

Following the EFA, a CFA was performed to assess the model's structure and its alignment with the observed data for validity and reliability. The CFA results indicated satisfactory model fit indices. A chi-square (χ^2) value of 254.510 ($p < 0.000$), degrees of freedom (df) = 87 and a χ^2/df ratio of 2.925 were obtained. Figure 2 displays the results of other fit indices, including the Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Goodness of Fit Index (GFI), Root Mean Residual (RMR), Tucker–Lewis Index (TLI), Incremental Fit Index (IFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), and Probability of Close Fit (PClose). All of these indices exhibited marginally acceptable fit statistics that exceed commonly recommended thresholds (Hair et al., 2020).

Furthermore, the model exhibits good validity and reliability (see Table 4). The standardized factor loadings for each item and AVE values for the theoretical constructs were greater than 0.50, indicating adequate convergent validity (Hair et al., 2020). The composite reliability (CR) and Cronbach's alpha (α) values for all theoretical constructs were above the threshold of 0.7. This demonstrates strong internal consistency and reliability (Hair et al., 2020). Discriminant validity was assessed using the Fornell-Larcker criterion. As per this criterion, discriminant validity is established when the square root of the AVE for each theoretical construct exceeds its correlations with any other construct in the model (Fornell & Larcker, 1981). In this study, the square root of the AVE for each theoretical construct was greater than its correlations with other constructs (see Table 5), hence confirming satisfactory discriminant validity (Fornell & Larcker, 1981; Hair et al., 2020). These analyses confirm that the hypothesised model was tenable and had a good fit to the data (Fornell & Larcker, 1981; Hair et al., 2020).



Model fit indices: GFI = 0.887, NFI = 0.925, IFI = 0.949, TLI = 0.938, CFI = 0.949, RMSEA = 0.083, RMR = 0.027, and PClose = 0.095.
Source(s): Figure created by authors.

Figure 2. Measurement model. Model fit indices: GFI = 0.887, NFI = 0.925, IFI = 0.949, TLI = 0.938, CFI = 0.949, RMSEA = 0.083, RMR = 0.027, and PClose = 0.095. *Source(s)*: Figure created by authors.

Table 4. Measurement model estimates.

Theoretical constructs and indicators	λ	α	CR	AVE
Consortium tendering (CST)		0.798.	0.896	0.634
• Cst1	0.704			
• Cst2	0.838			
• Cst3	0.895			
• Cst4	0.746			
• Cst5	0.784			
Procedural capabilities (PRC)		0.798.	0.925	0.711
• Prc1	0.843			
• Prc2	0.893			
• Prc3	0.871			
• Prc4	0.820			
• Prc5	0.785			
Participation of SMEs in public procurement markets (PPM)		0.798.	0.935	0.742
• Ppm1	0.866			
• Ppm2	0.874			
• Ppm3	0.892			
• Ppm4	0.830			
• Ppm5	0.845			

Source(s): Table created by the authors.

4.3. Descriptive statistics and correlation analysis

The descriptive statistics (mean and standard deviation [SD]) and inter-construct correlation analysis presented in Table 5 provide insights into the distribution, variability and relationships between the constructs in the study. PRC and CST have relatively moderate mean scores of 3.654 (SD = 1.722) and 3.545

(SD = 1.634), respectively. These results imply a convergence in SME suppliers' responses regarding the important role of PRC and CST in facilitating effective participation in PPM. PPM has also a moderate mean score of 3.940 (SD = 1.976), indicating a slightly moderate level of participation of SME suppliers in PPM. Moreover, the inter-construct correlation results show a moderate correlation between PRC and CST ($r = 0.583$, $p < 0.01$), PRC and PPM ($r = 0.444$, $p < 0.01$) and CST and PPM ($r = 0.375$, $p < 0.01$). The significant positive correlations suggest that both CST and PRC contribute meaningfully to SME suppliers' participation in PPM. The highest correlation (0.583) remains below the critical threshold of 0.7, indicating that multicollinearity is not a concern and that the constructs retain distinct conceptual identities (Pallant, 2020).

4.4. Structural model and hypotheses testing

4.4.1. Direct effects results

Table 6 are the results Hayes PROCES macro which was used in to test the direct and mediation effects between the study variables. The results show the path coefficients (β), standard errors (SE), *t*-values, *p*-values and confidence intervals with their respective hypotheses. The R^2 value for PRC was 0.282 ($p < 0.01$), indicating that 28.2% in PRC is explained by CST. Again, the value of R^2 for PPM was 0.201 ($p < 0.01$), implying that 20.1% in PPM is accounted by CST and PRC. Generally, the model demonstrates strong explanatory power based on the predictor variables. Both CST ($\beta = 0.201$, $p < 0.01$) and PRC ($\beta = 0.306$, $p < 0.01$) exerted a significant positive impact on SME suppliers' participation in PPM, providing sufficient empirical evidence to support H1 and H2. Furthermore, the direct effect of CST on PRC was also positive and statistically significant ($\beta = 0.497$, $p < 0.01$), which provides support for H3. With regard to control variables included in the model, only firm size demonstrated a significant positive effect on SME suppliers' participation in PPM ($\beta = 0.260$, $p < 0.05$). Firm age exhibited insignificant direct effects on SME suppliers' participation in PPM ($\beta = 0.041$, $p > 0.05$).

4.4.2. Mediation effects results

Table 5 presents the results of the mediating effects of PRC in the relationship between CST and SME suppliers' participation in PPM. The results reveal that the indirect effect of CST on SME suppliers' participation in PPM through PRC was positive and significant ($\beta = 0.152$, 95% CI [LLCI = 0.064, ULCI = 0.246]), supporting H4. The study revealed the total effect size of $\beta = 0.353$; $p < 0.01$, compared to that of the direct effect ($\beta = 0.201$; $p < 0.01$). Essentially, the conditions for a mediation effect were met, as the

Table 5. Descriptive statistics and constructs inter-correlation matrix.

	Mean	SD	AVE	MSV	ASV	PRC	CST	PPM
PRC	3.654	1.722	0.711	0.340	0.269	*0.843*		
CST	3.545	1.634	0.634	0.340	0.240	0.583**	*0.796*	
PPM	3.637	1.839	0.742	0.197	0.169	0.444**	0.375**	*0.862*

Note(s): **Correlation is significant at the 0.01 level (2-tailed). Italic fonts (italicized diagonals) are the square root of AVE. *Source(s)*: Table created by the author.

Table 6. Unstandardized coefficients determination of regression results.

Direct effects relationship	Estimate	S.E.	T	P	LLCI	ULCI
Main effects						
H1: CST → PRC	0.497	0.051	9.669	0.000	0.395	0.598
H2: CST → PPM	0.201	0.075	2.683	0.008	0.054	0.349
H3: PRC → PPM	0.306	0.076	4.029	0.000	0.156	0.455
Control variables						
Firm age → PPM	0.041	0.045	0.905	0.366	−0.048	0.130
Firm size → PPM	0.260	0.044	5.984	0.000	0.175	0.346
Total effect	0.353	0.067	5.299	0.000	0.222	0.484
Indirect effect						
		Effect	BootSE	BootLLCI	BootULCI	Effect
H4: CST → PRC → PPM		0.152	0.046	0.064	0.246	0.152

Source(s): Table by authors.

confidence intervals for all indirect effects did not include zero (Hayes, 2022). Given that both the direct and indirect effects in the model are positive and significant, the results confirm the presence of complementary mediation. Overall, the study indicates that the relationship between CST and SME suppliers' participation in PPM is partially mediated by PRC.

5. Discussions

The results from statistical analyses presented in the previous section support all the proposed four research hypotheses. Among others, the results supported the first research hypothesis (H1), which hypothesised a significant positive association between CST and PRC. As such, the findings reveal CST, either among SME suppliers, or with larger experienced firms as a potential predictor of PRC. This finding is consistent with prior empirical studies of Namagembe et al. (2021) and Flynn (2017) in Uganda and Ireland which also unfolded CST as a mechanism through which SMEs can enhance their PRC. The finding is also supported by those of Nemec (2024) in Slovakia, who also reported a significant positive role of CST in nurturing SMEs' PRC. Basically, CST enables SME suppliers to curb the procedural-related challenges for participation in PPM such as limited experience, complex procedure and limited resources. By engaging in CST, SME suppliers pool complementary resources and experience. Such collaborative approach, in turn, helps SMEs to strengthen their adaptive and competitive PRC for engaging in PPM (Akenroye et al., 2020; Ndrecaj et al., 2025; Nemec, 2025). Backed up by the DCV (Teece, 2007), the study finding implies that CST enables SME to overcome individual resource constraints, build adaptive capacities necessary to sense, seize, and reconfigure their capabilities for inclusive participation in PPM in Tanzanian context. Thus, CST operates not only as a market entry strategy but also as a dynamic capability that equips SMEs with the procedural competencies required to thrive in competitive public procurement markets (Glas & Eßig, 2018; Israel, 2025).

Again, the research findings confirm the second hypothesis (H2), signifying a significant positive effect of CST on SME participation in PPM. The finding corresponds with previous empirical studies conducted by Di Mauro et al. (2020) and Akenroye et al. (2022) in Canada and UK, which also highlight CST and corroborative arrangements as effective means for SMEs to overcome entry barriers and achieve success in PPM. Similar findings by Puksas et al. (2025) and Lu et al. (2021) also showed a significant positive role of CST in the success of SMEs in Lithuania and Chinese mega public contracts. Typically, CST help SME complement their limited resources, share risks, and collectively overcome entry barriers such as financial constraints and limited experience. This approach, according to Puksas et al. (2025), enables SME to meet stringent requirements of PPM, enhance their competitiveness and secure contracts which are otherwise difficult to secure under individual capacities. On the other hand, this finding contrasts with those of Reijonen et al. (2022) in Finland, who found an insignificant effect of CST on SME engagement in PPM. This discrepancy could be explained by differences in sample size, how CST is applied, and the structure of PPM a cross countries. However, the findings of this study reinforce the DCV's argument that dynamic reconfiguration of resources through alliances (in this case CST) serves as a strategic pathway for SMEs to sustain participation in PPM (Teece et al., 1997). It argues that CST is crucial in integrating and reconfiguring both internal and external resources and capabilities of SMEs to gain competitive advantages and inclusivity in PPM.

Further, the study's findings endorse the third hypothesis (H3) that PRC positively influences the participation of SME suppliers in PPM. The results suggest that SME suppliers having strong PRC can have a greater opportunity to access, compete and win PPM. This finding is opposite to that of Namagembe et al. (2021) in Uganda, who indicated no correlation between PRC and SME participation in PPM. This inconsistency might have been due to the contextual factors and variation in sample size and differences in PRC among SMEs across regions. Conversely, the results are consistent with other earlier empirical research by Flynn (2017) in Ireland that also note a strong positive relationship between PRC and SMEs engagement in PPM. This is explained by the fact that PRC, including the capabilities to meet and comply with tender qualification and evaluation criteria and manage awarded contracts enables SMEs to fulfil the requirements of PPM. Such abilities make SMEs more trustworthy and credible to the buying organizations, thus becoming more likely to be awarded contracts. Similarly, Flynn and Davis (2017) argued that SMEs' adaptability in PPM is enhanced by the ability to efficiently receive feedback on submitted

bids. This orientation, on its part, enables SMEs to prepare and shape their bids in accordance to the needs of the public buying organizations. Based on the DCV (Teece et al., 1997), this research paper considers PRC as an internal strategic resource that makes SMEs better placed to engage in PPM with sustained competitive advantages. It helps SMEs overcome bureaucracy, lower entry barriers and increase their chances of participation and success in PPM (Changalima et al., 2023; Flynn, 2017).

Finally, the findings confirm the critical mediating role (H4) of PRC in the influences of CST on SME participation in PPM. For SME suppliers, the findings underscore the significance of CST as a major driver that promotes PRC and overcomes challenges that hinder their participation in PPM. The finding corroborates previous studies that signify positive effect of CST on firms' competitive advantages and performance (Akenroye et al., 2020; Israel, 2025; Puksas et al., 2025). It is also consistent with Lu et al. (2021) and Puksas et al. (2025) findings, who opined that SMEs that actively engage in CST are better positioned to strengthen their PRC for effective participation in PPM. Thus, the PRC for SMEs' participation in PPM highs on how they leverage CST. This is because CST encourages the sharing of resources, expertise, experience and technical know-how in bidding for a particular tender. According to DCV (Teece et al., 1997), such integration can help SME suppliers build and reconfigure their PRC for participation in PPM by improving their competitive position, mitigating resource constraints, and reducing the risk of disqualification based on technical grounds. It also enables SMEs manage awarded contracts more effectively by offering competitive price and ensuring timely delivery of better-quality goods at cost effective, one of the critical requirements of public procurement (Di Foggia et al., 2025; Di Mauro et al., 2020). Thus, PRC, nurtured through CST act as the adaptive mechanism that allows SMEs reconfigure their internal and external competencies to improve their PRC, sense and seize public procurement opportunities.

6. Conclusion, implications and direction for further studies

6.1. Conclusion

This study examines how CST influences SME suppliers' participation in PPM, with a particular focus on the mediating role of PRC. The study exhibits a significant positive effect of CST and PRC on SME suppliers' participation in PPM. Also, CST shows a significant positive effect on PRC. Importantly, the study reveals PRC as a significant mediator of the relationship between CST and SME suppliers' participation in PPM. This implies that CST alone may not guarantee full participation of SME suppliers in PPM, unless they possess or develop adequate PRC. Consequently, the findings of this study present CST as a strategic mechanism that fosters SME suppliers' PRC for effective participation in PPM. Essentially, CST, either with peer or large firms, facilitates access to strategic resources and procedural-related capabilities as such documentation competence, knowledge and experience of procurement procedures. Aligned with DCV, CST enables SME suppliers reconfigure their internal resources and capabilities with those of joint bidding partners to effectively sense and seize tender opportunities and meet institutional and regulatory demands of PPM. It also enables SME suppliers overcome resource and PRC-related constraints, enhance competitiveness to navigate complex procurement processes. Generally, this study provides empirical evidence that the effect of CST on SME suppliers' participation in PPM is not purely direct, rather, it is partially mediated by PRC. It reinforces DCV's central proposition, underscoring that the success of SME suppliers in dynamic PPM depends not merely on possession of internal resources, but on the ability to integrate and reconfigure such resources to align with evolving demand of PPM.

6.2. Theoretical implications

The study makes a novel contribution to the existing literature and theory. With respect to existing knowledge, the study contributes to the existing body of knowledge relative to collaborative relationships, competitiveness and performance of SME suppliers in the realm of PPM. The originality and relevance of this research study lie within the conceptualization of CST within the theoretical frameworks of DCV, which is an integrated and adaptive approach, which aims to enhance the PRC of SMEs and also make them more competitive and inclusive. In particular, it examines the mediation effects of PRC in studying the relationship between CST and SME suppliers' active sustained involvement in PPM. Such

mediation effects have not been explored in prior studies. Existing studies in the field basically focus on direct relationship of CST (Di Mauro et al., 2020; Reijonen et al., 2022) and PRC (Flynn & Davis, 2017; Namagembe et al., 2021) for the successful engagement of SMEs in PPM. At its core, the study highlights CST as a dynamic factor that empowers SMEs with PRC and makes them more competitive in participate in PPM in a sustainable manner. This implies that strengthening PRC for active engagement in PPM, SMEs need to integrate their internal and external resources and capabilities with those of counterparts, large and more experienced firms by a means of CST. This is because CST acts as an extended framework that enables the growth of capabilities-based competitive advantages by virtue of sharing knowledge, experience and resources that are crucial for involvement in PPM. This argument aligns with the theoretical propositions of the DCV, which emphasize the need to develop and integrate internal and external firm resources and capabilities in order to achieve competitive advantage and improved performance. Theoretically, this study enriches the application of DCV, indicating how SMEs can make use of CST to dynamically reconfigure and build their internal and external resources to enhance their PRC and fit within the evolving environment of PPM.

6.3. Managerial and policy implications

This study has several managerial and policy implications for SME managers, policymakers and oversight authorities. To SME managers, the study suggests the need to leverage CST through joint bidding or subcontracting with peer SMEs or larger firms as a core strategy for pooling financial, technical, and operational resources required to build their PRC and enhance participation in PPM. SME managers should also establish networks and partnerships with other firms, industry associations, buying agencies, and business support organizations to identify potential consortium partners with complementary capabilities and resources needed to compete in PPM. To policymakers and oversight authorities, it is advised to establish and integrate a 'CST window' in the e-public procurement portal, where SMEs can register their competencies, search for complementary partners, share tender-related information, and jointly prepare bids for large public contracts. Moreover, SME managers, in collaboration with policymakers, should offer regular training and mentorship programmes to instil knowledge about the procedures and potential benefits of CST. These programmes may also cover procedural requirements in PPM, such as bid preparation, procurement processes, compliance requirements, and the administration and execution of public contracts. In addition, policymakers should offer simplified procurement process by removing or lessening certain rigid procedural requirements for SMEs like bid security, performance security and pre-qualifications standards. Lastly, policymakers and oversight authorities should infuse explicit performance indices to determine how CST is leveraged among SMEs or with large firms in the course of participating in PPM. Such assessment can help identify areas where improvements could be made, underscore the effect of CST and PRC, and refine strategies to enhance the involvement of SMEs in PPM. Together, these interventions can create an enabling mechanism in which SMEs not only have access to government procurement opportunities, but also acquire necessary PRC and become long-term participants and competitive in PPM.

6.4. Study limitations and future direction

Despite its contributions, this study has several limitations that point avenues for further research. First, the study focuses primarily on SME suppliers and PPM within the Dodoma, Dar es Salaam, Mwanza, Mbeya and Arusha regions of Tanzania. This limits the generalizability of the findings to other regions or sectors. Second, the study employed a cross-sectional quantitative research design to capture respondents' perceptions of the mediation effect of PRC in the relationship between CST and SME suppliers' participation in PPM at a single point in time. This design restricts the ability to examine causal relationships or long-term effects of CST and PRC on SME suppliers' participation in PPM. Third, while the study examined the mediation role of PRC, other contextual factors that may also interact with CST to influence SME suppliers' participation in PPM (e.g. technological capability, relational capital, institutional support or legal frameworks), were not accounted for.

Given these limitations, the study proposes a number of avenues through which future studies can be conducted. To start with, multi-sectoral studies should be carried out to determine whether the effect of CST and PRC varies considerably across different industries. They should extend to private institutions to examine how different regulatory environments and institutional supports influence the interaction between CST, PRC and participation outcomes. Secondly, future studies could adopt longitudinal or experimental research designs using a mixed-method approach to obtain more detailed insights into how CST and PRC interact over time to influence participation by SMEs in PPM. Lastly, other contextual factors could also be investigated for their mediation or moderating role in the relationship between CST and the participation of SME suppliers in PPM. Such factors can include technological capability, relational capital, institutional support or legal frameworks. These domains aim to extend both theoretical and empirical understanding of collaborative outcomes in industrial and public procurement.

Ethical approval

The study was approved by the Institutional Research Review Ethical Committee (IRREC) of the University of Dodoma (UDOM) and Reg. No. MA.84/261/84/12, dated 27th December 2024.

Informed consent

Informed consent was obtained from all participants prior to their involvement in the study. Participants were provided with a written consent form detailing the purpose of the research, the procedures involved, potential risks and benefits, confidentiality measures, and their rights as participants. They were assured that their participation was voluntary and that they were free to withdraw from the study at any time without consequence.

Authors contributions

CRediT: **Baraka Israel**: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing; **Ismail Juma Ismail**: Conceptualization, Data curation, Methodology, Software, Supervision, Writing – review & editing; **Alban Dismas Mchopa**: Conceptualization, Data curation, Formal analysis, Methodology, Software, Supervision, Writing – review & editing.

Disclosure statement

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

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Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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