JCBM (2024) 7(2) 16-33

University of Cape Town

Journal of Construction Business and Management

http://journals.uct.ac.za/index.php/jcbm

Cultivating Procurement Strategies to Manage the Tender Price Level for Public Infrastructure: A Case Study of IRCP (World Bank) Projects in Zambia

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Received 20 June 2023; received in revised form 24 July 2023, 08 August 2023, 10 August 2023, 25 February 2024 , 04 March 2024, 19 April 2024 and 02 June 2024; accepted 02 June 2024
https://doi.org/10.15641/jcbm.7.1.1380

Abstract

Public infrastructure-based clients implement extant procurement strategies without carefully evaluating particular requirements to select and adapt the most appropriate practices that cultivate the best and most practical benefits of a chosen procurement strategy. The study explored procurement strategies for managing and optimizing construction tender-price levels. The study is an exploratory case study utilizing a desktop review of numerous publications, public domain reports, and person-to-person interviews. The choice of methodology corresponds to the specific nature of the research environment and phenomena characterization of the lack of detailed primary research. The research involves a robust examination of documents and trend analysis of public procurement. It results from extensive extant literature, nine case study packages of improved rural connectivity projects (IRCP), and 21 expert interviews. Improved rural connectivity project (IRCP) is a World Bank-funded project for improving Zambia's rural road accessibility and strengthening institutional capacity. Eight fundamental characteristics related to a successful procurement strategy identified are cash flow assurance, guaranteed payments, and completeness of designs. Other characteristics include level and type of competition, contractor's breakeven point, adopted procurement process (work packaging), nature of government support, and protecting market share. The study further identifies central areas for developing a successful and responsive procurement strategy: procurement planning, preferential procurement policy (protectionism), and establishing differential procurement laws. These findings form an appropriate basis for developing relevant procurement practices that improve a procurement strategy for managing construction bid prices. The study indicates the possibility of further exploiting the potential of current procurement strategies for managing construction prices by suggesting a link between poor tender-price management and a high occurrence of procurement-related lapses. The findings highlight gaps only identifiable in tender-price management studies when taking a client perspective and considering the procurement context. This study assists to develop procurement strategies that enhance the chance of deriving value for money while maintain reasonable price levels.

Keywords: construction, construction tender price, procurement strategy, public projects

1. Introduction

All procurement methods aim to obtain value for money and promote private sector participation through the maximum possible competition (Public Procurement Act, No. 8 of 2020). According to the Zambia Public Procurement Regulations (2022), public procurement governance abides by

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fundamental principles, such as transparency, competition, economy, efficiency, fairness, value for money, and accountability. However, the prevailing procurement practices face criticism due to the "resulting adversarial relationships between the involved parties" and the construction processes' increased complexity and involvedness (Lahdenperä, 2014: p.2). There has been a comprehensive overall development of alternative, unconventional procurement methods "categorized by management of the interaction between the design and construction of the project" (Turina et al, 2008, p.2). By introducing unanticipated cost uncertainties, selecting and utilizing inappropriate procurement approaches can impact construction prices.

Consequently, providing clear prospects for cost reduction strategy and time value for money should be the basis for selecting public-construction project procurement systems. Procurement for public construction projects is challenging for procuring entities due to the fragmentation of the construction industry, which is "apparent most especially in the traditional separation of design and construction processes" (Jimoh et al, 2016, p.1096). Procuring entities and their procurement units require expertise correlating the government's project objectives with appropriate procurement approaches for attaining value for money and cost control during project implementation. Through making informed decisions at the contractor selection stage, procurement entities and units ensure the completion of public projects within acceptable costs, without delay and abandonment (Ajayi et al, 2010). The main contributor to public project failures is a lack of control and appreciation of procurement selection procedures and regulations by procurement units (CRC, 2009). Procurement strategy for public projects is thus a very critical subject that requires rigorous cost-benefit and price-sensitivity analysis for successful implementation.

Procurement provisions for acquiring public construction works hinder accelerated public service provision (Manyathi, et al., 2021). Procurement legislation is inefficient and ineffective and fails to govern how to procure public infrastructure works adequately (IMF, 2023). To mitigate shortcomings of procurement legislation, governments need to remove unnecessary red tape that discourages innovation while establishing benchmarks for detecting inexperienced and fraudulent contractors. Procurement legislation encourages tendering, a troublesome practice that impedes learning and obtaining total value (Arlbjørn & Freytag, 2012). Public-sector procurement is inherently different from private-sector procurement because that is mainly profit-driven. Public procurement addresses numerous social issues and requires thoughtfulness of its varied nature for specific demand environments. For example, public procurement for works requires entirely different practices, approaches, and skill sets than public procurement for goods and other services. In that regard, generic procurement legislation is unlikely to work in a public infrastructure context (Uyarra & Flanagan, 2009). Procurement legislation is essential to establishing policies for increased innovation regarding procurement models for contracting for public works.

Despite increased research on public procurement (Demircioglu & Vivona, 2021; Yusuf, et al., 2022; Fourie & Malan, 2020; Odhiambo & Theuri, 2015), the relationship between public procurement and managing prices for construction works remains unexplored. The study highlights the significance of procurement strategy in managing construction tender prices in public infrastructure projects. The study aims to contribute to practice and theory by offering lessons on using the procurement function to manage tender price levels and conceptualize the procurement function as a substantive strategy for increased delivery of public infrastructure. The question guiding this paper's analysis is 'why is the IRCP tender price level lower than that for government-sponsored periodic maintenance of feeder roads?' In doing so, the study explores factors affecting procurement strategy adoption. In addition, the study investigates procurement considerations and strategies for efficient tender-price management, focusing on the effects of current procurement selection strategies.

2. Literature Review

The paper analyzes extant scholarly literature on tender price management to provide an overview of factors affecting adoption of a procurement strategy. The section further reviews the effects of extant procurement strategies on the tender price level. The literature serves as the foundation for this paper, guiding its methodology and choice of applicable theories.

2.1 Theoretical review

The study organizes its theoretical framework into two sections. The first section involves the agency cost theory, which attempts to reveal numerous factors that influence construction tender price development from the contractor's perspective. The second section highlights the importance of a resource-based approach to enhancing government roles and

involvement and highlights the institutional perspective regarding developing and adopting a procurement strategy. This study aims to examine and establish any relationships between construction industry actors in addressing construction tender-price inflation. The agency cost is crucial in the study because it allows the research to investigate concepts such as interaction, environment, and behavior, thereby assisting the research in examining the thought processes of public construction agents. The resource-based theory allows the study to determine the government functioning model and reveal the strategies and role of government through public infrastructure delivery aspects.

2.1.1 The agency cost theory

The Agency Theory assumes that (1) both agent and principal are intently self-interested, (2) both agent and principal are rational, and (3) agents always seek to minimize risk (Bosse & Phillips, 2016). The theory explains how the principal (government) engages an agent (contractor) to execute construction works. The theory attempts to reconcile the goals and objectives of the agent to those of the principal. The idea is essential in managing contractors on construction sites as it tries to address principal-agent risk tolerances (Markowitz, 2005). The Agency Theory presents the client with a rational contractor who, instead of "furthering their interests, is aiming to maximize own usefulness" (Glinkowska & Kaczmarek, 2015, p. 88). This theory explains the specific behaviors of construction contractors that collectively create financial problems in public infrastructure delivery. "Essential features of the agency problem are that the interests of the principal and agent diverge, resulting in unmeasurable and significant costs and inefficiencies ultimately borne by society" (Bosse & Phillips, 2016, p. 276).

Today's agency theory assumes the pursuit of self-interests at any cost due to "simplistic and unrealistic premises which constitute the basis of the theory" (Kultys, 2016, p. 632). Kultys (2016) suggests numerous additional requirements for reshaping relationships between the principal and the agent to benefit the public. The theory structure does not sustain nor necessarily protect the public from competing self-interests. Kathleen M. Eisenhardt (1989) concluded that agency theory is an empirically valid perspective that offers an exceptional perception of sector uncertainty and risks only when coupled with complementary perspectives. Governments (clients) must realize that the lack of balancing views in applying the theory makes it narrow and dangerous. Hence, there is a profound need to utilize the theory in examining and realigning the relationship between clients and contractors by focusing on the theory's strengths, weaknesses, opportunities, and threats. Today's challenges in public sector construction projects exposed severe dysfunctions in government-contractor relations that are inspiring to scrutinize the theoretical and practical components of the agency theory applicability. The theory remains an undisputedly popular approach in implementing public infrastructure projects, yet "normatively and theoretically the theory is more problematic than is usually recognized" (Widmalm, 2016, p. 127). Problems in public construction sector have arisen within the 'nexus of contractor's bids' that characterize the modern tender pricing procedures where contractors act to control costs by maximizing firm profits. It is where contractors' interests have likely diverged from the employer's. Accordingly, Sanfelix and Puig (2015) argued that applying Agency Theory is successful in traditional sectors with easily standardized processes and procedures.

2.1.2 Resource-based theory

The competitiveness in the modern construction sector depends on one's ability to utilize the knowledge and sufficiently exploit knowledge flows within the organization (Villasalero, 2016). This theory posits that organizations should look internally to build that competitive advantage through their resources. The resource-based theory states that possessing resources is valuable, inimitable, rare, and challenging to substitute (Chuang & Lin, 2017). Therefore, governments need to develop and utilize their knowledge flows to benefit from their existing inimitable resource base within the public construction sector instead of relying on contracting out all public works. The relational view of the resource-based theory places governments in some global competition to deliver public infrastructure through linkages or networking (Wong, 2011) and or tapping into other firms (contractors) to meet their obligations by mobilizing external resources in construction.

The resource-based theory of competitive advantage, if used as a framework for innovative implementation of public construction projects, should work in favor of the government, for it possesses a great extent of valuable resources. The theory argues that support and sustainability of internally executed public infrastructure are attainable through (1) utilizing internal resources of government, (2) enhancing the government's capabilities in using those resources, and (3) ensuring innovation's contribution to the financial performance of government (Holdford, 2018). Governments are in a good position to implement accessible composite frameworks or models that elaborate the natural relationship between

resource-based and knowledge-based views in developing specific assets and ensuring that society fully benefits from that unique competitive advantage (Theriou, et al., 2009).

The resource-based theory makes valuable contributions, particularly when formulating strategic alliances with contractors based on rationale and performance (Das & Teng, 2000): in line with support to transactional price economics in public construction projects through utilizing internal resources of government. Governments can harness both their tangible and intangible resources, leading to unprecedented competitive advantage and securing societal benefits by regularly interrogating perspectives of their resource-based views. Under the Resource Based Theory, governments can perform better if they internally implant public construction projects because they hold valuable assets and unique characteristics.

2.2 Advantages and disadvantages of extant procurement strategies

The paper investigates several procurement strategies commonly used in the construction sector and public organizations. Table 1 outlines the advantages and disadvantages of each strategy.

2.3 Factors affecting the adoption of a procurement strategy

Ogunsanmi (2013) researched the effects of procurement-related factors on construction project performance in Nigeria and found that cost-related factors showed the highest impact on project performance of all procurement selection criteria. His findings further show that other factors, particularly time and quality, influence public construction project performance. Due to the complex nature of construction projects, there is no single approach to selecting an appropriate procurement strategy for an individual project. For the successful implementation of a project, there is a need to consider a decision-support model that encompasses all the factors that might be significant (Ratnasabapathy & Rameezdeen, 2007). Rajeh et al. (2014, p.56) argue that the selection of an appropriate procurement strategy is an essential element to project success and should consider factors such as "cost, quality, time, project complexity, certainty, risk, responsibility, and degree of control by the client." Love et al. (2008) found an entrenched culture of uncertainty avoidance guiding selection while researching procurement methods in Australia.

Dahiru and Bashir (2015) found the existence of risk-related factors that restricted the success of construction procurement performance by causing a substantial increase in the overall project cost leading to an increase in the tender price. Their results are essential to developing a supportive mechanism for risks management in public construction procurement management by recognizing that "corruption-related risk, conflict of interest, ineffective project technical feasibility, and lack of commitment to transparency are the most significant factors limiting construction procurement performance" (Dahiru & Bashir, 2015, p.77). They recommend selecting a construction-procurement system by focusing on curbing risks related to corruption, conflict of interest, and practical technical feasibility when attempting to improve the whole project's performance. El Agha and El Sawalhi (2013) found six significant factors that influenced the selection of Construction procurement methods in the Gaza Strip. These factors include price competition; degree of project complexity, time constraints, project size; client's financial capability, and experience in procurement methods.

Bakar et al. (2009) carried out research involving five non-governmental organizations following the devastation caused by a 9.2 earthquake in Aceh, Indonesia. Their findings show factors that influenced the procurement method for the reconstruction efforts included timing, responsibility, and the quality of work. In comparison, Ajayi et al. (2016) found, in their research on procurement selection criteria for projects in the public sector in Nigeria, that quality, cost, and duration of the project determined the type of procurement method to implement. In Tanzania, procurement processes are directly affected by a lack of knowledge in ICT when using E-procurement, poor record keeping, and a lack of personnel training on procurement matters (Ivambi, 2016). The principal factors that influence the selection of procurement systems include; the client's willingness to be actively involved; the flexibility to change design during both the design and construction period; risk allocation/avoidance; project size; client's experience; the certainty of cost and time; experienced contractor availability; client's trust in other parties; client's requirement for value for money; and project type (El Sawalhi and El Agha, 2016).

2.4 Effects of multiple sourcing strategies in Zambia

In Zambia, all procuring entities use multiple sourcing strategies coupled with the lowest price selection practices. According to the Zambia Public Procurement Act (2020), a procuring entity means a government agency, parastatal body, or any other body or unit established and mandated by the government to procure public funds.

Table 1: Advantages and disadvantages of procurement strategies

Procurement Strategy	Description	Author(s)	Advantages	Disadvantages
Single/Sole Sourcing	A Procurment strategy in which works are obtained from a single supllier without competitive bidding	Costantino & Pellegrino (2010) Inderst (2008); Mandal (2015) Faes & Matthyssens (2009) Chen (2016) Kimetto et al. (2019) Washington (1997) Cachon & Zhang (2006)	1. Emboldens simplified supply chain management for more vital collaboration 2. Encourages negotiations, thereby increasing the potential for price discounts 3. High potential for long-term mutual benefits	1. Higher vulnerability and risk exposure resulting from dependency 2. Hinders cost reduction due to lack of price competition 3. Higher prices resulting from lack of competition
Multiple Sourcing	A Procurment strategy in which works are acquired from a multiple supllers through competitive bidding	Costantino & Pellegrino (2010) Inderst (2008); Mandal (2015) Faes & Matthyssens (2009) Chen (2016)	Better pricing resulting from increased competition	Loss of negotiation power by the client
Modular sourcing	A Procurement strategy that involves breaking down complex project or service into distict components that are later sourced independently from different suppliers	Buchmüller et al. (2018) Knittig et al. (2004) Becker et al. (2021)	Reduced logistic and material costs	Creates dependencies that lead to the exploitation of the market by contractors or suppliers
Outsourcing	A Procurement strategy in which an organization contracts tasks to a third party service provider rather than doing them inhouse	Somjai (2017) Moh'd et al. (2016) Ana-Maria (2015) Kremic et al. (2006) Lankford & Parsa (1999)	Better economies of scale lead to cost savings	1. Creates dependency on the contractor's reliability 2. Hidden costs
Insourcing	A procurement strategy of perfoming tasks internally within an organization rather than outsorcing from third parties	Foerstl et al. (2016) Constantin & Hila (2014)	High potential for cost savings due to better alignment of organizational goals and objectives	Increased operational and administrative overhead costs
Global Sourcing	A procurement strategy in which an organization acquires services, goods or works from suppliers who are located in diffrenet countries	Kotabe & Murray (2004)	Provides access to a broader range of global markets	Increased costs due to complexities in supply chain management

Multiple sourcing is challenging for procuring entities due to the fragmentation of the construction industry, which is "apparent most especially in the traditional separation of design and construction processes" (Jimoh et al., 2016, p.1096).Procuring entities and their procurement units require expertise correlating the government's project objectives with appropriate procurement approaches for attaining value for money and cost control during project implementation. In terms of the impacts of current strategies, Table 2 lists the effects of multiple sourcing procurement strategies and practices gathered from the literature. The notable impact of multiple sourcing methods and techniques includes increasing project costs, enabling profit repatriation by foreign firms, and complicated bidding decisions due to derisory and limited scope of selection criteria. In addition, current procurement practices encourage imperfect competition, emphasizing a focus on price and transferring uncertainties onto project performance. Failure to highlight the client's and project-specific requirements often leads to selecting incompetent contractors.

Table 2: Effects of multiple sourcing procurement strategies

Impact	Observations based on literature	References
Increase project costs	Embody lowest price selection leading to imperfect competition by artificially lowering prices.	Bochenek (2014), Ajayi, et al. (2010) and Lavelle, et al. (2007)
Profit repatriation	Permit multinational construction companies to dominate the construction industry.	John et al. (2019)
Complicates Bidding Decision	Evaluation of the competitive bidding model in public projects places particular emphasis on price.	Alzober & Yaakub (2014)
Imperfect competition	Focus on price competition among bidders	Thiruchelvam & Tookey (2011)
Uncertainties about project performance	Ignores the procurement impact on project performance	Ogunsanmi (2013), Demirkesen & Bayhan (2019), Rajeh, et al. (2014) and Ghadamsi (2016)
Derisory selection criteria	Fails to consider many technical and commercial factors	Lavelle, et al. (2007), Ajayi, et al. (2010), Rajeh, et al. (2014) and Ajayi (2017)
Selection of incompetent contractor	Fails to emphasize the requirements of the client and project	Dwarika & Tiwari (2014)

Through making informed decisions at the contractor selection stage, procurement entities and units ensure the completion of public projects within acceptable costs, without delay and abandonment (Ajayi et al., 2010). The main contributor to public project failures was a lack of control and appreciation of procurement selection procedures and regulations by procurement units (CRC, 2009). Procurement for public projects is thus a very critical subject that requires rigorous cost-benefit and price-sensitivity analysis for successful implementation. An informed approach to the selection of the most appropriate procurement system is central to the success of any public infrastructure project. Choosing a proper procurement system, crucial in implementing public projects, is even more difficult with the increasing fragmentation and complexity of the construction industry. The failure to decide on an appropriate procurement system could result in time delays, cost overruns, and quality problems (Al-Jawhar and Rezouki, 2012). Silwimba & Mwiya (2017, p.10) rightfully argue that "project success or failure is not dependent on a procurement method alone."

The literature shows that an implementation gap exists such that public infrastructure-based clients often overlook that the suitability of a procurement strategy is dependent on the nature of the project and specific organizational goals and objectives. Therefore, they implement extant procurement strategies without carefully evaluating particular requirements to select and adapt the most appropriate practices that cultivate the best and most practical benefits of a chosen approach.

3. Methodology

The study is an exploratory case study utilizing a desktop review of numerous publications, public domain reports, and person-to-person interviews. The choice of methodology corresponds to the specific nature of the research environment and phenomena characterization of the lack of detailed primary research. The research involves a robust examination

of documents and trend analysis of public procurement. It results from extensive extant literature, nine case study packages of improved rural connectivity projects (IRCP), and 21 expert interviews. Improved rural connectivity project (IRCP) is a World Bank-funded project for improving Zambia's rural road accessibility and strengthening institutional capacity. The project aims to improve selected feeder roads through upgrading, habitation, and maintenance interventions. The project enhances feeder roads to gravel and low-cost-seal standards. The project has several components; however, the study concentrates on the construction component of feeder roads. The study adopts a purposive and snowball sample of experts and personnel involved in the execution or implementation of IRCP. The study identified and interviewed seven respondents directly managing IRCP projects and interviewed 14 key industry experts later. The paper adopts an unobtrusively qualitative approach to generate specific characteristics of improved rural connectivity projects (IRCP), procurement considerations, and strategies for efficient tender-price management.

3.1 Respondents' profile

Respondents included vital industry stakeholders (Table 3) whose age group ranged between 35 and 65 years. The respondents' experience was crucial in determining the evolution and true nature of the construction industry regarding tender price management. Table 3 shows the respondents' classification into six general practice areas. The target for each category is to represent a specific industry and project professional contribution. Of the fourteen (14) respondents, three were civil engineering consultants, three contractors, two architects, three quantity surveyors, two civil engineers (client representatives), and one procurement specialist.

Table 3: Professions sampled

Qualification/Area of Practice	No. of Participants (n=14)	Percentage (%)
Civil engineering consultants	3	22
Contractors	3	22
Architects	2	14
Quantity Surveyors	3	21
Civil engineers/client representative	2	14
Procurement expert	1	7
Total	14	100

Four respondents had over 30 years of experience; seven had experience ranging between 20 and 30 years, while three had practical experience between 15 and 20 years (Table 4). The sample group profile indicated that respondents comprised 22% civil engineering consultants, 22% contractors, 21% quantity surveyors, 14% architects, 14% client representatives, and 7% procurement experts. All respondents were construction-project managers with holistic understanding and experience regarding the construction sector and its various aspects. The selection of respondents reduced the selection bias while improving the representativeness of the sample categories. Among the respondents, one had a Ph.D.; two had bachelor's degrees, and eleven had master's degrees (seeTable 4).

3.2 Methods of Data Analysis

The study presented the findings as verbal accounts and narratives of lived experiences gathered through interviews. The study utilized thematic analysis of key informant interviews to extract price mitigations and envisaged strategy characteristics.

4. Findings

For this study, a focus on reliable documents such as Auditor General's reports, project progress reports, and interviews generated relevant data for analysis regarding procurement strategies for managing construction prices. Table 5 outlines the packages (and their corresponding detail) of the IRCP project. Table 5 indicates that improved rural connectivity projects (World Bank funded - IRCP) had an average construction tender price of ZMW610,069.28/km or ZMW707,680.36VAT Inclusive (for the same period), about 32% lower than that for (similar projects) unpaved roads under government funding shown in a cross-case analysis in Table 6.

Table 4: Participants for research interviews

Description	Age	Academic qualification/Highest level of education	Experience (years of practice)	Area of Practice/Expertise
PP1	47	Bachelor of Engineering (Civil & Environmental Engineering)	22	Civil engineering consultant
PP2	40	MSc Project Management	18	Contractor
PP3	65	MSc (Construction Management & Economics)	40	Quantity surveying & Construction management
PP4	52	Bachelor of Engineering (Civil & Environmental Engineering)	27	Civil Servant/Public Infrastructure-Based Institution
PP5	42	MSc Business Management Bachelor of Engineering (Civil Engineering)	17	Contractor
PP66	39	MEng Construction Management BSc Architecture	15	Architectural consultant
PP7	51	MSc Project Management BSc Building Science	25	Quantity surveying consultant
PP8	63	MSc Architecture PGDip. Project Management and Building Law; BSc Architecture	30	Architectural consultant
PP9	49	MSc Logistics & Supply Chain management; BSc Procurement Management; Dip. Chartered Institute of Purchasing & Supply	22	Civil Servant/Public Infrastructure-Based Institution
SP1	50	Ph.D. (Transportation Economics) MEng Civil (Pavement & Transportation) BEng Civil & Environmental Engineering	24	Public project financing
SP2	56	MEng Civil (Pavement Design) BEng Civil & Environmental Engineering	30	Civil engineering consultant
SP3	49	MEng Construction Management BEng Civil & Environmental Engineering	25	Civil engineering consultant
SP4	49	MEng Project Management BEng Civil & Environmental Engineering	22	Contractor
SP5	60	MSc Construction Management BSc Quantity Surveying	35	Quantity surveying consultant

Key: Purposive Participant (PP); Snowballing Participant (SP)

Further, preliminary literature indicates that construction pricing is influenced quantitatively by macroeconomic indicators such as inflation, exchange rate, interest rate, government debt, foreign direct investments, imports, trade deficits and budget deficits. Other qualitative factors include but are not limited to the construction price level, procurement strategy, project management practices, project-related risks, corruption, political interferences, adopted pricing models, stakeholder management strategies, political policy, and extant legislative framework.

The findings show that IRCP tender prices do not correlate strongly to macroeconomic indicators compared to government-funded unpaved road projects. IRCP tender prices had a strong negative correlation with interest rates (-0.84). In contrast, tender prices for upgrading to bituminous and periodic maintenance of feeder roads positively correlated with interest rates. In addition, IRCP tender prices show only weak positive correlations to forex and inflation. The averages for IRCP were as low as 71% of the average tender prices of feeder road projects (see Table 5 and Table 6).

Table 5: Construction tender prices for improved rural connectivity project IRCP

Location (Province)	Package No. (Districts)	Project detail	Tender-price VAT Exclusive (ZMW/Km)
Central	Package 1 in Mkushi District (254km)	The contract was signed with Sinohydro Zambia Ltd in May 2019 at a sum of K143,245,597.98 VAT Exclusive	584,675.91
	Package 2 in Chibombo & Mumbwa Districts (247.9km)	The contract was signed with China CAMC Engineering Co. Limited in May 2019 at a sum of K158,222,480.56 VAT Exclusive	640,576.84
Eastern	Package 3 in Petauke & Nyimba District (324.84km)	The contract was signed with China Geo-Engineering Corporation on 8 May 2020 at a sum of K178,467,322.32 VAT Exclusive	549,400.70
	Package 4 in Petauke, Sinda, and Katete Districts (180.95km)	The contract was signed with Zhongmei Engineering Group Limited on 5 May 2022 at a sum of K120,843,552.47 VAT Exclusive;	667,828.42
Northern	Package 7 in Mungwi, Mbala, and Senga Districts (204.36km)	The contract was signed with Sinohydro Corporation Limited on 7 May 2020 at a sum of K101,226,481.85 VAT Exclusive;	495,334.13
	Package 8 in Luwingu and Kasama Distrcts (198.85km)	The contract was signed with China Jiangxi International Economic and Technical Corporation Company Limited on 3 June 2020 at a sum of K91,666,713.42 VAT Exclusive;	460,984.23
	Package 10 in Samfya and Chifunabuli Districts (186.93km)	The contract was signed with Longjian Road and Bridge Company on 11 May 2020 at a sum of K81,585,918.62 VAT Exclusive;	436,451.71
Southern	Package 12 in Zimba, Kazungula, and Kalomo Districts (155km)	The contract was signed with M and N Industrial Merchants Limited on 28 January 2022 at a sum of K115,494,706.94 VAT Exclusive;	745,127.14
Muchinga	Package 14 in Chinsali and Shiwang'andu Districts (186.753km)	The contract was signed with M and N Industrial Merchants Limited on 28 January 2022 at a sum of K143,824,214.14 VAT Exclusive;	770,130.68

External debt averaged 15.05bn, US$16.45bn, and US$17.7bn in 2019, 2020, and 2021 respectively (Tembo, et al., 2023). Macroeconomic values reasonably corresponded to increased construction tender prices for similar government-funded road works. For example, in the period under review, similar government-funded projects indicated a strong positive correlation with foreign exchange rates, while IRCP tender prices only had a weak positive correlation.

Table 6: Cross-case analysis

Case Firms	Main project types	Scope	Intervention	Average construction tender price (ZMW/Km) (VAT Inclusive)
MLGRD	Unpaved - Feeder Roads	Infrastructure design and construction	Periodic maintenance of feeder roads	1,000,912.87 (Tembo, et al., 2023)
MIHUD/ RDA	IRCP – World Bank Funded	Improve rural road accessibility	Output and performance-based capacity building	707,680.36

The IRCP tender prices do not correlate strongly to macroeconomic indicators (Table 7) compared to similar road projects. IRCP tender prices have a strong negative correlation to interest rates. In contrast, tender prices for periodic maintenance of feeder roads positively correlated with interest rates, despite the period between 2019 and 2021 recording average forex rates of 12.91, 18.28, and 20.05, respectively.

Table 7: IRCP tender-prices/macroeconomic correlation coefficients

Year	**2019**	**2020**	**2021**			
	584,675.91 640,576.84	549,400.70 495,334.13 460,984.23 436,451.71	667,828.4 745,127.1 770,130.7	**Averages**	**Coefficient (r) Pearson's**	**Comment**
Average (ZMK/Km)	612,626.38	485,542.69	727,695.41	610,069.28	**-**	-
Forex rates	12.91	18.28	20.05	17.08	**0.21**	Weakly positive
Inflation rates	9.1	15.7	22.1	15.63	**0.47**	Weakly positive
Interest rates	25.6	26.8	25.7	26.03	**-0.84**	Strongly negative
FDI (US $'Bn)	0.55	-0.17	0.19	0.19	**0.52**	Moderately positive

Table 7 indicates a weak positive correlation with forex rates, inflation rates, and FDI. However, there is a strong negative correlation between IRCP tender prices and interest rates; there is enough evidence of other factors' significant influence on construction tender prices. This section explicitly studies the rationale and factors that affect IRCP tender pricing to develop critical mechanisms toward coherent conceptualization of factors influencing tender pricing. The study derived IRCP-specific characteristics from the content and thematic analysis of the interview data set. The final list of drivers to IRCP tender pricing includes seven emergent themes (see Table 8).

Table 8: IRCP Characteristics

Emergent theme	**Comments from interviewees**
Cash flow assurance	Funds are readily available; There is assured cash flow.
Guaranteed payments	Payments are made on time; there is payment certainty; payments are guaranteed.
Completeness of designs	Designs are completed before procurement processes commence.
Competitiveness	There is high competition, competitive prices due to increased demand, and fewer jobs; international competition improves pricing modeling.
Breakeven strategy	Foreign firms want to stay in construction as long as they can; the industry has slowed down, so the IRCP offers the only viable projects on the market, and contractors are strategizing to bid as low as possible so that they can at least have some works to guarantee some income.
Work Packages (Procurement strategy)	Breaking work into packages creates demand, giving potency for competitive pricing, a stringent procurement process that requires an understanding of bid rates.
Government support	Foreign firms win all IRCP projects because they receive (their) government support such that they can outbid local contractors with artificially low prices.
Protecting market share (Life cycle strategy)	Foreign firms have created a competitive advantage in the construction market, and they know that government projects have gone down; so instead of leaving for other global markets due to reduced government spending on projects, they stay longer by lowering prices just to be able to sustain their operations without having to pack up.

In that regard, the study identifies eight procurement-related driving factors that influence the development of tender prices for IRCP projects, which include cash flow assurance, guaranteed payments once contractors make a claim, completeness of designs during tendering that allow bidders to make more precise estimations and high levels and standards of competition. Other factors include attempts by foreign firms to breakeven to prevent exiting the industry as government-related works slow down, and the procurement strategy of packaging work into small lots, thereby simultaneously generating and guaranteeing demand.

Regarding optimal procurement implementation and strategy, research findings reveal ten procurement aspects for developing a procurement strategy presented in Table 9. The study derives and clusters the features through analysis of interview contents. The clustering indicates the following elements for procurement consideration: ensuring adequate project budgeting, timely procurement planning, enhancing usage of the construction price index, ensuring early involvement of contractors, legislating preferential procurement for local contractors, and rationalizing competition and procurement process. Others include providing adequate information and communication management and differentiating construction procurement laws from general procurement laws. Further, Table 6 categorizes strategies for managing construction tender prices through procurement function into three main approaches: Procurement planning, Protectionism, and Procurement policy.
The study findings indicate that procurement strategies such as procurement planning, protectionism, and policy provide adequate room for the broad spread of tender-price management challenges. Table 9 identifies procurement strategies of significance for efficient price management and performance in the construction sector, and methodologies to achieving them include: developing informed engineers' estimates early during project planning stages, benchmark prices of construction elements through price indices and developing procurement controls for tendering processes, which enhance market predictability, improve stakeholder involvement and understanding of project requirements, building capacity and resilience of local firms to ensure competitiveness by developing exclusion and inclusion criteria, anticipating instability of macroeconomic indicators, eliminating tender errors, and streamlining and shortening procurement processes. Others include ensuring transparency and developing appropriate information dissemination criteria, localizing the context of international bidding standards and promoting partnerships by making local firms lead participants, ensuring clarity of tender documents from the onset and eliminating human error or influence in handling documents, and ensuring construction professionals manage construction project procurement by developing construction-specific procurement laws and involving construction professionals in procurement policy-making

5. Discussion

Findings from the study suggest that significant adverse effects of extant procurement strategies eminent from failure to develop their strategy coupled with a copy-and-paste approach to implementing procurement processes. Following this argument, indications of procurement problems such as failure to domesticate procurement strategies suggest a lack of information, innovation, and primary usage of available strategies. Odhiambo & Theuri (2015) highlighted a high correlation between organizational performance and human resource skill level regarding the effective implementation of public procurement processes. Odhiambo & Theuri (2015) also suggest a positive correlation between contractor management and organizational performance. This study finds that the early involvement of contractors is a sure way of improving stakeholder involvement during procurement planning. It is reasonable to allege that a lack of clearly defined project technicalities and poor stakeholder understanding of project requirements prove an inert lack of stakeholder integration. The study finds that contractors account for lack of project understanding through increasing tender prices. Other studies show that stakeholder integration should be encouraged throughout procurement (Mensah & Tuo, 2013; Rebs, et al., 2018; Bohari, et al., 2020).

Table 5 findings indicate the significance of the completeness of project designs and procurement documents before commencing a procurement process during the development of tender prices. Findings by Subramani et al. (2014) and Gomarn & Pongpeng (2018) further argue that deficiencies in project procurement management and documentation cause delays in project implementation and cost escalations. This study further finds that contractors tend to price with a consideration of such deficiencies to avert obvious related multiple underlying risks.

Table 9: Procurement considerations and strategies for efficient tender price management

Procurement considerations	Relevance	Interviewee comments	Procurement Strategy
Ring-fence adequate project budget **Ensure timely procurement planning**	Develop informed engineers' estimates early during project planning stages	• Utilize experienced professionals (quantity surveying consultants) • Include estimated budgets of the project in the tender	Planning
Enhance the construction price index	Benchmark prices of construction elements	• develop procurement controls for tendering processes • enhance market predictability	Planning
Early involvement of contractors	Improve stakeholder involvement	• clearly define project technicalities • enhance stakeholder understanding of project requirements	Planning
Legislate preferential procurement for local contractors	• Build capacity and resilience of local firms • Ensure fair competition	• Utilize joint ventures • Develop exclusion and inclusion criteria	Protectionism
Rationalize competition and procurement processes	• Build capacity for local firms • Anticipate instability of macroeconomic indicators	• Eliminate tender errors • Streamline and shorten procurement processes • Shorten procurement process • Streamline competition	Protectionism
Information and communication management	• Ensure transparency and appropriate information dissemination criteria	• Utilize corporate governance principles • Depoliticize the project procurement process	Policy
Contextualize international bidding standards	• Localize the context of international bidding standards	• Make local firms more competitive • Promote partnerships by making local firms lead participants	Differential Procurement Policy
Model procurement documents	• Ensure clarity of tender documents from the onset	• Develop clear bidding procedures • Ensure fairness during procurement • Eliminate human error or elements in handling documents	Policy
Differentiate construction procurement laws from general procurement laws	• Adjust some of the provisions in international contracting and procurement forms to suit the local market • Ensure construction professionals manage construction project procurement	• Develop construction-specific procurement laws • Involve professionals in policy-making	Differential Procurement Policy

Interviews (Table 5) show that contractors lowered their tender price in an event where all procurement and project-related documentation is considered 'complete.' Extant research (Hamzah, et al., 2011; Gebrehiwet & Luo, 2017) focuses on the direct relationship explained by inadequate design and project documentation on project reworks, variations, and delays. The study finds (Table 6) that eliminating tender errors, developing clear bidding procedures, and eliminating human error or elements in handling documents are crucial in modeling procurement documents that ensure price clarity.

The study finds the need to build the capacity and resilience of local firms and ensure fair competition. Table 6 identifies two specific ways of utilizing joint ventures and developing exclusion and inclusion criteria for foreign firms to capacitate local contractors. The procurement function needs to legislate preferential procurement for local contractors by establishing a preferential procurement policy framework that specifies categories of preference in the allocation of contracts regarding the nationality-ownership of firms. It ensures the protection of local firms against unfair competition as well. However, protectionist policies must be accompanied by more dynamic public supply chain management systems that provide consequences for local firms that, despite support, fail to perform as required (Nkwe, et al., 2015). Smallwood et al. (2011) agree that preferential procurement requires streamlining capacity-building programs and developing procurement performance management systems to work. Table 5 indicates the significance of government support regarding winning a construction tender. The case study shows that foreign firms win improved rural connectivity project packages because they receive government support to outbid local contractors with artificially low prices. Hlakudi (2015) and Magoro and Brynard (2010) warn of the challenges of implementing preferential procurement policies, including late supplier payment government incompetence, increased non-compliance with procurement processes, and corruption and fraudulent activities.

Further, the study finds that IRCP case study packages obtain low construction tender prices attributable to cash flow assurance. The study observes that a 'World Bank' procurement culture of ring-fencing project funds for timely payment of construction work receives critical consideration during the development of tender-price by bidders. A study by Hlakudi (2015) makes a similar observation in its recommendation to 'ring-fencing the budget' for public project execution and prevent payment delays by the government. On the other hand, Bevan (2007) argues against ring-fencing government expenditure as national budgets should naturally combine spending varieties for optimizing government objectives without offering sectorial-special guarantees, which may compromise particular abilities and functions of government. And yet, this study finds that ring-fencing project funds provide a much-needed guarantee that contractor payments would not be delayed. This guarantee results from appropriate procurement planning that enables contractors to price lower, as in the case of IRCP packages. The study considers the ring-fencing of project funds critical management essential to construction project success. The study reveals how the ring-fencing factor is tightly related to project cost control by the client and the bid-price decision of the contractor. Ramlee et al. (2016) agree that project cost is a critical success factor for guiding and predicting future project success. The study finds that ring-fencing enhances the relationship between bid-price management in the construction industry and project management performance.

6. Conclusion

Construction procurement delivers value for all project dimensions, including tender price and long-term cost reduction. Consequently, construction procurement devises strategies for mitigating tender-price inflation appropriately and sufficiently. Construction procurement develops and implements appropriate price management systems to deliver value and reduce and control construction tender prices. The study explored procurement strategies in the context of managing construction tender-price. Eight fundamental characteristics related to a successful procurement strategy identified are cash flow assurance, guaranteed payments, and completeness of designs. Other characteristics include level and type of competition, contractor's breakeven point, adopted procurement process (work packaging), nature of government support, and protecting market share. The study further identifies central areas for developing a successful and responsive procurement strategy: procurement planning, preferential procurement policy (protectionism), and establishing differential procurement laws. These findings form an appropriate basis for developing a relevant procurement strategy for managing construction bid prices.

Findings suggest an appreciable occurrence of current procurement strategy constraints linked to evidence of project cost increase, profit repatriation, imperfect competition, project performance uncertainties, and derisory selection criteria. There is an indication of optimal adoption of the lowest price selection strategy in public procurement to manage construction tender-price. This approach creates imperfect competition by artificially

lowering prices at tendering and later subjecting the project to other cost-related risks. The study findings indicate the possibility of further exploiting the potential of current procurement strategies for managing construction prices. The study suggests a link between poor tender-price management and a high occurrence of procurement-related lapses. The findings highlight gaps only identifiable in tender-price management studies when taking a client perspective and considering the procurement context. The paper provides a management perspective for exploring and investigating the use of procurement strategies to address a tender-price management problem instead of popular approaches and studies focusing solely on project cost escalations related to the project implementation phase.

The findings offer insight into managing construction prices through adopting and developing appropriate industry-specific procurement-related interventions. The study also contributes knowledge concerning price-driven performance in construction. Extant studies referenced and discussed in the paper explore the effects of adopted procurement strategies and construction project-related constraints. This study has examined a gap regarding construction tender-price level with a specific focus on utilizing procurement functions to manage construction tender-price in developing countries like Zambia. The paper provides an explicit basis for future studies into building a more robust understanding regarding the contribution of the procurement function to construction price levels in other developing countries.

6.1 Limitations

In making the above contribution, the study is limited to only nine 'World Bank-funded rural connectivity project packages.' It may, as a result, affect the generalizability of the results. However, the research sets a baseline for studying the procurement function concerning tender-price management. Considering this limitation, future studies need to increase the number of cases for more extensive practical evidence.

6.2 Theoretical Contribution

The findings indicate that agent behavior is determined and influenced by the nature and type of the principal, which means that the agent's rationality is directly proportional to the rationality of the principal. While numerous other research recognizes that the principal and agent act rationally, this research indicates rationality's nature. The study's findings contribute to the agency theory in expounding and understanding how agents seek and deploy ways to minimize risk and maximize profit at the expense of principal behavior. The study provides empirical evidence to Widmalm's (2016) research, which points to problems of the theory. This research empirically establishes that modern tender pricing procedures where contractors act to maximize profit by anticipating employer behavior is the central area where agents' interests have significantly diverged from those of the employer in public construction sector. Accordingly, this study theorizes that, in practice, the agency theory, in its traditional form, does not apply to modern public construction sector practice in developing countries like Zambia.

Regarding resource-based theory as theorized by other research (Villasalero, 2016; Wong, 2011; Holdford, 2018; Theriou, et al., 2009), the study finds that governments in developing countries like Zambia have failed to utilize their unique competitive advantage to create and implement composite frameworks encompassing their resource-based and knowledge-based views. Hence, in practice, this study contributes to the work of Das & Teng (2000) to enhance strategic alliance with contractors based on rationale and performance for resource-based theory to make a valuable contribution. Under this theory, this study posits that governments can better harness resources if they implement some construction projects internally.

6.3 Practical Implications

The study offers several practical implications that significantly impacts the overall performance of the public construction sector:

1. Cost estimation: understanding tender prices allow public institutions to accurately estimated the cost associated with a project. This enables them to prepare competitive budgets that reflect the true cost of delivering construction projects.
2. Bidding strategy: understanding tender prices helps public institutions assess market trends. This information assists to develop procurement strategies that enhance the chance of deriving value for money while maintain reasonable price levels.
3. Risk Management: studying tender prices provides insights into potential risks associated with construction projects such as budget overruns and project disruptions. This also helps public institutions allocate resources effectively at planning stage.

Contract negotiation: knowledge regarding tender prices serve as a basis for contract negotiations between contractors and clients. By understanding the factors that influence tender prices, public institutions can develop policies and negotiate contract terms that are protect their Interests.

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