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Impact of Tender Price Variability on Economic Sustainability of Construction Sector in Developing Countries

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ABSTRACT:*Economic sustainability in the construction sector is increasingly important in developing countries, and threats from construction tender price variability and inflation require immediate action. While global trends emphasize sustainable construction practices triggered by rapid economic growth and augmented environmental impact considerations, this paper underscores the significance of adopting tender-price practices that focus on attaining economic sustainability for enhancing sustainable development in developing countries. The study predicates how construction tender price variability accentuates sustainable construction practices. The study identified respondents through purposive sampling for better insights and a more thorough investigation of the construction tender-price phenomena. The adopted method presented the study with information-rich participants and cases regarding issues of central significance to the inquiry. In addition, the study utilized snowball sampling in which existing respondents recruited or referred other respondents from among their professional acquaintances. The study findings 13 factors requiring immediate consideration to address construction tender price variability and inflation. These include material costs; interest rates; equipment costs; labor costs; delayed payments; exchange rates; and the nature and type of project. The results categorize four specific areas significantly affected by high construction tender prices. The harmful impacts were immediate and more severe to stakeholders like the government (client). The effect on projects is equally devastating; however, contractors appear to experience more positive-impact though in the short term. The long-term effects of high construction tender-price variability inflation were detrimental to all stakeholders by observation. Thus, the article recommends strategies that address tender price sustainability challenges faced in the construction sector.*

KEYWORDS: Economic sustainability, tender price, developing countries, the construction sector

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INTRODUCTION

In developing countries, construction plays a crucial role in development and has significant implications for resource utilization; hence specific measures alleviating challenges associated with economic sustainability in construction become crucial-general arguments of good industry practice.Thus, economic sustainability in the Construction-sector is increasingly important in developing countries, and threats from construction-tender price variability and inflation require immediate action. Studies show that critical factors for achieving economic sustainability in construction include implementing strategic and project-level environmental impact assessments, adopting green public procurement, and improving stakeholder coordination (Uttam, 2014). Recently, Mjakuškina, et al. (2019) found factors of high significance in providing high-quality work and ensuring sustainable project supervision, including enhancing collaboration between project stakeholders. Others include adopting new technologies, developing internal control systems, and developing industry-wide technology management capacities (Yilmaz & Bakis, 2015). According to Lowe, et al. (2003), challenges associated with economic sustainability construction and influencing sustainable business implementation in the sector include higher capital costs, lack of accurate cost information, unreliable long-term profits, and invincible market value.

Governments in developing countries require an understanding of factors for sustainable-construction success and managing sustainable construction by integrating stability, resilience, and adaptability dimensions (Schilling, et al., 2018). The success of sustainability approaches in construction depends on individuals' and groups' actions as they define dynamic structures, processes, and system functions. Implementing sustainable construction depends on three specific aspects: identifying drivers for sustainable construction, addressing resistance or barriers to sustainable building, and developing initiatives for achieving sustainable construction (Plank, 2008; Hill & Bowen, 1997). These aspects are critical in defining how much the system must change over a given period and the process requirement of change toward sustainability practices. In some cases, the change process could be radical and disruptive, while in others be subtly incremental and smooth (Plummer & Van Poeck, 2021). Sustainable construction assists in generating improvements in procurement ways consistent with advancing development by integrating social and environmental well-being. One significant component, however, of sustainable construction lies in developing local strategies informed by regional scenarios. The process requires understanding country-specific sustainability challenges followed by appropriate policy and regulatory changes. Hence, the state's role in designing and developing appropriate policy mixes in the construction-sector context should be emphasized (Söderholm, 2020).

While global trends emphasize sustainable construction practices triggered by rapid economic growth and augmented environmental impact considerations, this paper underscores the significance of adopting tender-price practices that focus on attaining economic sustainability for enhancing sustainable development in developing countries. Thus, the article recommends strategies that address tender-price sustainability challenges faced in the construction sector. The areas of interest for this research included exploring principles of economically sustainable construction, investigating drivers of sustainable construction, understanding implementation barriers to economic sustainability in construction, and exploring economically sustainable strategies in construction. The study predicates how construction tender price variability accentuates sustainable construction practices.

LITERATURE REVIEW

Literature confirms sustainable construction is fundamental to national development. The section has reviewed the literature to highlight the multi-disciplinary nature of sustainable construction, including cost reduction necessities. However, the literature reviewed in this affirms that to achieve benefits from sustainable construction, policymakers and government need to improve upfront planning, ensure less bureaucracy, ensure better competencies among project members, ensure more effective use of resources, ensure better project control, and enhance project delivery structures.

Multi-disciplinary nature of sustainable construction

Among the principles of sustainable construction and particular interest to this study is Hill and Bowen's (1997) economic pillar. They listed elements influencing economic sustainability in construction (Hill and Bowen, 1997, p. 28), ensuring financial affordability of construction and utilization of full-cost accounting and real-cost pricing during bidding. Hill & Bowen (1997) identify four pillars of sustainable construction: economic, technical, social, and biophysical sustainability (Table 4). They argue for the prominence of adopting real-cost pricing mechanisms to achieve equitable development and resource utilization. Lowe, et al. (2003) present economic, social, technical, and environmental dimensions to the concept of sustainable construction and further argue that most research fails to account for the economic dimension and its related ideas. Due to the construction sector's business nature, they say it is crucial to emphasize an economic view of construction sustainability and set underlying economic principles, including long-term benefits, value for money, and stakeholder partnerships.

Similarly, Akadiri, et al. (2012, p. 131) highlights the significance of incorporating objectives and strategies addressing construction-tender price, "initial cost or purchase cost," when implementing construction sustainability principles. They argue the approach is critical to sustainable construction because it improves sector productivity, ensures stakeholder satisfaction, increases

cost predictability, ensures lower project cost, provides the best value for clients, and focuses on developing the client's business. Akadiri, et al. (2012) concentrates dimensions of sustainable construction on economic, social, and environmental dimensions. At the same time, Hill and Bowen (1997) included technical and biophysical dimensions. In the same vein, Oke, et al. (2019) defined sustainable construction through ecological principles. Ecological principles come about environmental sustainability. On the other hand, Zhong & Chen (2011) presented a different tenet of cultural sustainability and drew similarities between lean and sustainable construction principles. They argue that lean construction is pivotal in sustainable construction task management.

Table 4 Principles of sustainability

Author (yr)	Focus	Principles of sustainability
Hill & Bowen (1997); Sabeke (2008)	Environmental protection	Social, technical, economic, environmental, biophysical
Al-Yami & Price (2006)	Resources utilization	Tripple-bottom-line (Environmental, social, economic)
Zhong & Chen (2011)	Lean construction concepts	Social, ecological, cultural, and environmental
Akadiri, et al. (2012)	Resource conservation and cost efficiency	Tripple-bottom-line (Environmental, social, economic)
Esezobor (2016)	Policy reforms	Tripple-bottom-line (Environmental, social, economic)
Lim, et al. (2019)	Quantity Surveying	Process-oriented approach, Social, technical, economic, biophysical
Grierson & Moultrie (2011)	Sustainable archtectural design	Tripple-bottom-line (Environmental, social, economic)
Salama & Hana (2018)	Environmental protection	Tripple-bottom-line (Environmental, social, economic)
Isa, et al. (2014)	Sustainable building	Environmental, social, economic, and design and innovation

(Source: Made by the authors)

The sustainability principles in Table 4 form a framework for the implementation of sustainable practices in construction by guiding construction processes and decision-making. The sustainability principles are multi-disciplinary encompassing features that create a competitive advantage for the sector. Successful construction project management is significantly affected by the detail in direction through a planning process. Integration of all sustainability principles happens at the project's planning stage by specifically including various stakeholder perspectives. With the advent of climate change issues and fiscal-resource limitations in most third-world countries, measures accounting for applying economic principles of sustainability need to be enhanced.

Cost efficiency characteristics of economic sustainability

While applying sustainability principles and concepts, prioritizing discussion on benefits associated with cost reduction strategies at the early stages of construction project management is paramount. This process allows timely consideration of resource conservation while enhancing construction attributes to eliminate unnecessary costs and client satisfaction. Oke, et al. (2019) noted that the construction industry's impact on the national economy is worrying despite its fundamental potency for development and growth. The concern arises from a failure to incorporate cost-reduction measures and financial incentives orchestrated by the government while adopting sustainable construction practices. In addition, Dosumu & Aigbavboa (2021) consider construction cost the most significant variable in adopting sustainable construction practices. They further observe that sustainability discourse focuses more on environmental than economic benefits, thereby slowing the adoption of sustainable construction practices in weak economies. Alattyih, et al. (2019) advances financial performance drivers for construction projects, which ascertain maximizing cost efficiency and achieving cost certainty significant to construction sustainability. The monetary savings through reduced procurement and implementation costs constitute and define economic sustainability in the construction sector. Ekung, et al. (2021) affirm that cost-reduction strategies to facilitate the adoption of sustainable construction remain fundamentally unsound and ineffective. They developed a framework that proposes adopting procurement practices such as using collaborative contract forms, integrating supply chain, employing sustainability qualification recruitment, competitive process selection, fixed price contracting, and single point responsibility for cost reduction. Zulu, et al. (2022) approve focusing measures for improving sustainable construction on regulatory, economic, and cost-related interventions. Table 5 summarizes the drivers of sustainable construction as obtained from the literature review.

Table 5 Drivers of economic sustainability in construction practice

Author	Country	Drivers	Annotation	Summary	Synthesis
Oke, et al. (2019)	Zambia	• Cost reduction • Resource efficiency • Strengthening implementation mechanisms • Cooperation and partnerships • Developing regulatory mechanisms • Competitive advantage • Financial incentives	The research identified 23 drivers of sustainable construction in the Zambian construction industry (a few are highlighted hereto). The study further emphasizes the need to enhance the adoption of sustainable construction practices by implementing research findings and enforcing legislation that supports construction.	Research identifies cost reduction and resource efficiency as some of the critical drivers of sustainable construction	The research fails to develop a model or framework for the adoption of construction practices in the Zambian construction sector (only recommends it); Findings rate resource efficiency and cost reduction drivers, with mean scores of 4.00 and 3.75, respectively; However, it fails to underscore the drivers' strategic influence on the sector affected by escalating tender prices. Therefore, the research fails to fully reveal the underlying mechanism for transforming the Zambian construction industry towards sustainability.
Zhang, et al. (2020)	German	• Quality	The research describes a building project's social, technical, and environmental quality aspects. The study develops a holistic quality model (HQM) that enhances control and decision points.	The research considered all three quality aspects in setting up a holistic quality model with a specific focus on their interrelations.	The research fails to highlight an understanding of how quality through its model would affect the bottom line by not integrating the role of institutional quality. The study would have considered the

Author	Country	Drivers	Annotation	Summary	Synthesis
					sum of bureaucracy, corruption, government stability, investment profile, standards and regulations, and legislation by integrating institutional quality. The model is not applicable because a change in quality characteristics and their interrelation means that control; and redefined decision points for different processes and construction phases.
Bohari, et al. (2016)	Malaysia	• Compliance with government policy and • Compliance with industry guidelines	The research found that formulating government policy and industry-specific guidelines triggered the push for sustainable construction.	The research acknowledges the lack of experts and practitioners in sustainable construction, making findings difficult to generalize since they had to work with a limited sample size.	This research's findings prove that the influential power of critical stakeholder groups is a significant factor in the push and awareness generation of sustainable construction practices. There is no academic theory to underpin identified drivers to sustainability, which points further to a lack of a coherent approach in the field, leading to many scholars finding different drivers.

Author	Country	Drivers	Annotation	Summary	Synthesis
Dahiru (2019)	Nigeria	• Improve maintenance and operating cost savings • Integrating environmental needs into project needs • Improve environmental compliance • Improve value for money on projects	The research found 13 drivers that provide a push for sustainable construction procurement practices.	The research provides insight into an emergent strand of construction sustainability that allows a new focus on incorporating environmental considerations into procurement stages to promote the adoption and implantation of sustainable construction practices.	The findings of this research underscore the fact that sustainable construction balances on sustainable procurement practices that must reflect all functional requirements spearheaded by a national institutional and legal framework that supports and enables construction prices that reflect value for money better.
Omopariola, et al. (2019)	Nigeria	• Education and Awareness • Environmental and economic integration • Cooperation, partnerships, and participation • Guidelines and sustainability assessments	The research found the use and adoption of conventional construction processes and practices to be a significant barrier to sustainable construction practices. The study further identified poverty to be a barrier to sustainable construction.	The research emphasizes the essence of maximizing the use of resources through savings and the application of sustainable assessment systems.	The research identifies a large number of both barriers and drivers to sustainable construction. Still, it fails to highlight the core mechanisms and their impact on the transition toward sustainable construction within the industry.
Bidin, et al. (2020)	Malaysia	• Tax incentives toward	The research finds that knowledge about green	The research provides six strategies (integration of	The research only focuses on the niche level and fails to

Author	Country	Drivers	Annotation	Summary	Synthesis
		sustainable practices • Sustainability guidelines and policies • Sustainability assessments • Top-level commitment and stakeholder values	building and sustainable construction among construction stakeholders in Malaysia is still deficient.	green practices; guidelines and policies; constant assessment; management commitment; stakeholder values; and incentives) for adoption to accelerate sustainable construction practices, derived from prior literature and validated using focus group interviews.	underscore the drivers that motivate construction stakeholders to adopt sustainable practices. The study concentrates its efforts at the management level and largely ignores establishing and highlighting current dynamics contributing to the growth of sustainability innovation.

(Source: Made by the authors)

Implementation barriers to sustainable construction

Economic and cost-related barriers prevent the effective adoption of sustainable construction (Zulu, et al., 2022; Durdyev, et al., 2018; Munyasya & Chileshe, 2018; Ohiomah, et al., 2019). These factors include a lack of government incentives, financial incentives, higher initial cost, etcetera. The higher initial cost is the main economic barrier to sustainable construction (Lim, et al., 2019; Zulu, et al., 2022). Toriola-Coker, et al. (2021) affirm that barriers to sustainable construction include affordability issues synonymous with the general perception of higher cost or expensive buildings. Therefore, developing methods by generating local, lowering construction costs, and increasing economies of scale of mass production is fundamental for enhancing sustainable construction. Furthermore, Serpell, et al. (2013) argue that critical factors to sustainable construction include economic conditions specific to a country and traditional practices associated with its construction industry. Each country ought to develop condition-specific measures and methods of addressing sustainability-construction challenges.

On the other hand, Häkkinen & Belloni (2011) underscores the need to set measurable targets during requirement setting, tendering, and procurement processes. They argue that procurement tools, methods, information, and procedures are barriers to sustainable construction. At the same time, Krechowicz (2022) finds a conservative approach with no action strategy to problem solving to be some of the main barriers to sustainable construction. Similarly, Brooks & Rich (2016) note that different perspectives of multiple states and stakeholder decision-making influence sustainable construction efforts. They further argue for the sustainable construction modification of existing country-specific procurement construction practices rather than introducing fundamental transformations. Long, et al. (2021) affirms public infrastructure management systems exhibit certain complexities and dynamism due to external influences; therefore, integration and enhanced interaction of public internal elements is the fundamental driving force to promote sustainable construction behavior. At present, Khalfan, et al. (2015) founds at least 60% positive perceptions among contractors regarding efforts addressing economic aspects of sustainable construction. They conclude that financial incentives to clients and contractors and overall government implementation policy constitute critical factors to sustainable construction. Table 6 discusses literature findings regarding barriers to implementing sustainable construction practices.

Table 6 Barriers in the implementation of sustainable construction

Author	Country	Barriers
Bahidrah & Korkmaz (2017)	Saudi Arabia	• Lack of awareness • Lack of lean construction training • Lack of top management support
Lim, et al. (2019)	Australia	• Inadequate understanding of sustainable construction • Inadequate awareness and practice of the five principles of sustainable construction • The culture of the construction industry • Attitudes of clients • High initial investment costs • Lack of sustainable measurement tools • Lack of building codes on sustainability

Author	Country	Barriers
Chang (2016)	China	• Lack of adequate awareness of sustainable development • A lack of consideration of the social and economic dimensions of sustainable construction • Ineffectiveness of some policies • Weak practices toward environmental sustainability • Variability in strategic sustainability behaviors among contractors
Said, et al. (2011)	Malaysia	• Lack of awareness • Lack of proper enforcement mechanisms • Inadequacies in legislature
Marsh, et al. (2020)	South Africa	• Social-cultural barriers • Economic barriers • Technological barriers • Stakeholder barriers • Political barriers
Ogunbiyi, et al. (2011)	United Kingdom	• Prevalent use of the theory of construction • Business strategies that lack lean construction implementation
Willar, et al. (2021) Samari (2012)	Indonesia Iran	Implementation constraints of sustainable principles
Anzagira, et al. (2021)	Ghana	Lack of awareness
Serpell, et al. (2013)	Chile	• Lack of financial incentives • Lack of integrated design • Affordability issues
Elmualim & Alp, (2016)	Cyprus	• Lack of government policy • Lack of interlink with international construction • Lack of awareness
Oyewobi, et al. (2017)	Nigeria	• Lack of government commitment • Integrating and implementing sustainability issues
On & Techapeeraparnich (2021)	Cambodia	• Lack of support mechanisms for investors • Lack of government incentives • High investment cost • Lack of government commitment • Lack of responsible authority • Lack of government coordination and legislation • Negligent implementation • Lack of sustainability strategy • Lack of availability of sustainable materials
Ametepey, et al. (2015)	Ghana	• Cultural resource resistance

Author	Country	Barriers
		• Lack of government commitment • Higher investment cost • Lack of professional knowledge • Lack of legislation
Zuofa & Ochieng (2017)	United Kingdom	Failure to embrace sustainability practices and initiatives
Enshassi & Mayer (2005)	Palestine	• Lack of knowledge • Lack of training • Lack of legislation • Tendency to resist modern construction methods • Resistance to change legislation • Reluctance to try new ideas • Reluctance to adopt innovative technologies
Zhou & Lowe (2003)	United Kingdom	• Higher capital cost • Lack of accurate cost information • Unreliable long-term profits • Invisible market value
Uttam (2014)	Sweden	• Requirement of a high level of corporation among project stakeholders • Lack of coordination between project planning and implementation
Pradhananga, et al. (2021)	Venezuela	• Corruption • Inflation • Lack of environmental awareness

(Source: Made by the authors)

Sustainability initiatives in construction

Approaches and initiatives to enhancing sustainable construction vary according to prevailing circumstances and aspirations of a government. While others will take more hesitant practices to attain their objectives of construction sustainability movement, others will choose more controversial ones. Conversely, employing various economic tools and incentives is the most supported policy initiative. They are addressing affordability issues through incentives, advancing public policies and regulations as paramount for boosting profitability and competitiveness of sustainable construction agenda. Díaz-López, et al. (2021) confirm critical factors or drivers for supporting sustainable construction include those strategies related to financial and government interventions. However, Myers (2005) findings indicate that not all contractors positively embrace sustainable construction agenda, further complicating its implementation. Henceforward, only a few construction contractors are willing to change their business paradigm towards embracing sustainable construction. Arguably, Kibwami & Tutesigensi (2016) observe that it is much easier

to adopt measures promoting environmental sustainability than economic sustainability since the traditional interpretation of sustainable construction is characteristic of environmental protection. Taylor & Norval (1994) contend that the main challenge in all African countries is modeling construction systems and activities based on norms and practices with little or nothing to do with local experience. Similarly, Adebayo (2014) urges the adoption of procurement systems focused on addressing macroeconomic issues and country-specific developmental needs.

Table 7 summarizes various initiatives adopted for implementing sustainable infrastructure construction activities as gathered from the literature review. Major initiatives regarding economic sustainability include the move to minimize construction costs to support the local economy. It is achieved by migrating traditional construction practices and approaches to more modern ones involving contractors in procurement through competitive dialogue procedures and creating incentives to address the high initial investment cost (Whang & Kim, 2015; Esezobor, 2016). The literature agrees on the need to generate more action and strategies for enhancing the adoption of sustainable construction through developing appropriate standards, regulations, and public policies.

Table 7 Initiatives for implementing sustainable construction

Author	Country	Initiatives
Willar & Pangemanan (2019)	Indonesia	• Establishing cooperation among parties • Determining the method of project delivery system • Equating vision of sustainability for all stakeholders • Developing the criteria for sustainable infrastructure design • Using technically, environmentally, socially, and economically competent contractors • Identifying sustainable construction materials
Al-Yami & Price (2006)	Saudi Arabia	• Shifting stakeholder thinking from cost to value • Implementing long-term thinking over short-term
Whang & Kim (2015)	South Korea	• Reducing life-cycle cost • Minimizing construction cost • Minimizing operation and maintenance issues • Supporting local economy • Ensuring commercial viability
Tafazzoli (2018)	United States of America	Creating incentives to address high initial investment cost
Esezobor (2016)	Nigeria	• Reducing the traditional focus on economic values to more inclusive socio-environmental values • Migrating traditional constructions practices to modern approaches • Improving awareness • Renewing thinking

Author	Country	Initiatives
		• Developing the capacity to support sustainable construction
Khalil (2018)	Libya	• Increasing awareness and adoption of sustainable practices • Changing understanding of the role of construction in national development • Focusing education and training on the benefits of sustainable construction • Ensuring functional application of legislation • Ensuring leadership commitment • Improving the ability to support sustainable construction
Zhou & Lowe (2003)	United Kingdom	• Developing a green market in the built environment • Developing a clear sustainable strategy for construction
Uttam (2014)	Sweden	• Emphasizing the significant role of procurement • Inter-linking impact assessment and green public procurement • Involving contractors in procurement through a competitive dialogue procedure • Incorporating sustainable values in public procurement decisions

(Source: Made by the authors)

RESEARCH METHOD

The study identified respondents through purposive sampling for better insights and a more thorough investigation of the construction tender-price phenomena. The adopted method presented the study with information-rich participants and cases regarding issues of central significance to the phenomena of inquiry. In addition, the chapter utilized snowball sampling in which existing respondents recruited or referred other respondents from among their professional acquaintances. The study ensured that the nominated subjects and generated pool of participants exhibited similar traits as the purposively sampled ones. The study transcribed recorded interviews for coding and eventual analysis. The chapter used person-to-person interviews to collect data from 14 interviewees (Table 8) and the questionnaire survey (Table 9).

Respondents' profile for purpose sample

Respondents included key industry stakeholders whose age group ranged between 35 and 65 years with at least fifteen or more years of experience. Respondents' knowledge was crucial in determining the evolution and true nature of the construction industry regarding tender-price management. As seen in Table 8, the study classified respondents into six general practice areas—the target for each category 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.

Four respondents had over 30 years of experience; seven respondents had experiences between 20 and 30 years, while three had experiences between 15 and 20 years. 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 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.

Table 8 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

Profile of respondents for questionnaire survey

The respondents represented critical stakeholders in the construction industry. As indicated in Table 9, contractors represented 80% of respondents. This category was essential in the study because it consisted of almost equal numbers of local and foreign firms registered with NCC while conducting this research. The target was to obtain good representation from the category most impacted by foreign-firm competition. Clients' respondents represented 98%, while engineering-based consultants constituted 78.8%.

Questionnaire administration and survey period

The study administered the questionnaire online over seven weeks, from 23 June to 10 August 2022. The researcher created and administered the online questionnaire through a free platform by the "kobo toolbox." The questionnaire conveyed a covering ethical statement, identified the type of research to the respondent, and explained the study's purpose.

The response rate for the questionnaire survey

The study used 170 construction industry practitioners for the questionnaire survey. Out of 170, the study collected and accepted 147 questionnaires. Table 9 shows the distribution and response rate of questionnaires. Therefore, the study achieved a total response rate of 86.5%. All questionnaires received were useable as no questionnaire submitted was without data.

Table 9 Distribution and response rate of questionnaires

Questionnaires	Contractors	Clients	Consultants	Architects	Quantity Surveyors	Grand Total
Distributed	46	51	33	28	12	170
Received	37	50	26	24	10	147
Useable Frequency	25.17	34.01	17.69	16.33	6.80	100
Response rate (%)	80.43%	98.04%	78.79%	85.71%	83.33%	86.47%

FINDINGS

The findings show that the significance of construction tender price relates to economic, business, project, and procurement dimensions. Table 10 shows a list of claims from 14 expert respondents regarding the significance of tender prices concerning the financial sustainability of the construction sector. The measurement indicators for tender price consisted of five measurement facets: a measure of project value, a determinant of project success, a basis for contract award, an indicator of nature and level of competition, and an indicator of demand. Respondents evaluated their understanding of tender price concerning five-set-out measurement indicators. Participant choices regarding the significance of construction tender price show an excellent long-term appreciation and understanding, among sector players, of its impact on the sector. Table 11 highlights factors affecting the development of construction tender-price from collected interview data. The frequency and percentages in Table 11 further show that five characteristics out of 25 elements have a ratio above seven. These factors include interest rate, equipment cost, material cost, labor cost, and delayed payments.

Table 10 Participant construct related to construction tender-price

Participant construct regarding significance of construction tender-price	**Measurement variables: Themes**				
	A measure of project value	Strength of demand	Indicator of competition	Basis for award	Determinant of project success
The significance of tender price is in control. First, it is a basis for the comparison of tenders.				✓	
Tender price is paramount in projects because it gives a fair estimate of what governs the budget for your project to be successful. It forms a basis of cash flow approach projections for project delivery.	✓				✓
The tender price is critical to business operations because these undertakings aim to generate revenue and profit. So logically, the tender prices highly affect a contractor's existence and financial wealth. It also sometimes involves the methodologies of implementing projects.	✓	✓	✓		✓
The tender price reflects the understanding and assumptions of the bidder.	✓				✓
The tender price guides the project in terms of managing the finances. Moreover, prior to contracting, it indicates how pricing affects the budget provided. In addition, it gives the estimated cost of the works to guide more or so in the project's budgeting framework and financial management.	✓				✓
Tender prices are significant on a project as they determine the quality and what sort of intervention you will get. The price is essential because it will decide in the end whether you get a good quality job or not to some extent, and it, to some time, will signify what sort of quality a contractor you get.	✓	✓		✓	✓
Tender price in construction projects determines many factors like quality, scope of works, etc., which constitute the tender price.	✓		✓	✓	
Tender pricing is critical to construction projects because it brings about value for money for a client and is a strategic way	✓	✓	✓		

that construction companies use to grow by building up their costs and profits from there, which ultimately helps in the growth of the construction sector at large.					
The tender price of a construction project is what determines the success or failure of the project. The price reflects the proposal on how the contractor intends to undertake the work. Therefore, the price has to be reasonable enough for the contractor to undertake the project to fruition. In addition, they meet all their costs and even have a bit of markup in there. However, at the same time, it should be economical enough for the client to get value for money. The price must be suitable and sufficient for the client to get value.	✓	✓	✓	✓	✓
The tender price is crucial because you can appreciate a cross-sectional representation of value for money.	✓				
The tender price is for contractors to maximize their profit based on the available opportunities and competition. In summary, the significance of the tender price is just for the profit of the contractors or the people doing the business.	✓	✓	✓		
The tender price is essential because it forms a basis for negotiating the contract sum.				✓	
It is a basis for measuring value for money and the financial evaluation of a bidder.	✓			✓	
The tender price is a benchmark used to arrive at a responsive bidder.	✓		✓	✓	✓

Table 11 Summary of factors affecting the development of construction tender-price

S/N	Identified Factor	Frequency	Percentage (%)
1	Nature and level of competition	4	4.7
2	Capabilities of the contractor	2	2.3
3	Interest rate	8	9.3
4	Equipment cost	6	7.0
5	Material cost	9	10.5
6	Inflation rate	4	4.7
7	Labor cost	6	7.0
8	Profit markup	4	4.7
9	Allowance for price adjustment	1	1.2
10	Risk of delayed payments	6	7.0
11	Exchange rate	5	5.8
12	Political risks	4	4.7
13	Nature and type of project	5	5.8
14	Availability of materials related to the project	1	1.2
15	Contractor's workload	1	1.2
16	Nature & type of procurement	3	3.5
17	Project scope	2	2.3
18	Poor project management practices	3	3.5
19	Project location & site conditions	2	2.3
20	Transportation	2	2.3
21	Nature & type of client	4	4.7
22	Nature & type of stakeholders involvement	2	2.3
23	Regulatory environment (taxes etc.)	1	1.2
24	Nature & type of contract	2	2.3
25	Project duration	2	2.3

The study findings show that construction tender prices are set with various factors. While Table 11 shows a broad range of factors influencing pricing in construction, Figure 1 is a Pareto chart showing the top 13 factors requiring immediate consideration to address construction tender price inflation. These include material costs; interest rates; equipment costs; labor costs; delayed payments; exchange rates; and the nature and type of project. Others are nature and level of competition, inflation rate, profit markup, political risks, character and type of client and project management practices. Accordingly, as shown in Figure 1, project-related costs (materials, equipment and labor) and delayed contractors' payments are the most crucial factors contributing to construction tender-price inflation.

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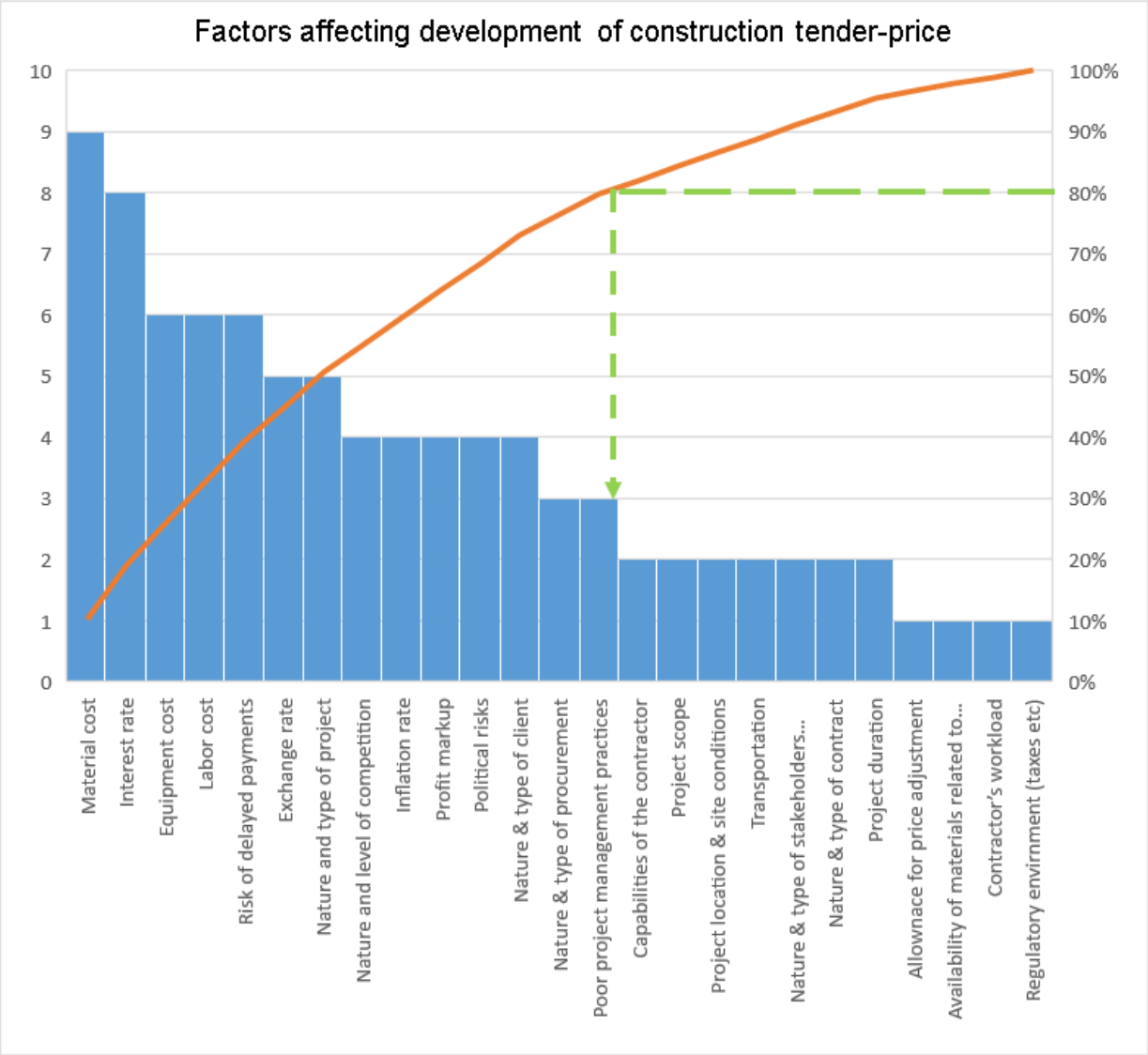

Fig. 1: Factors affecting the development of construction tender-price

Impact of high construction tender prices

The results in Table 12 categorize four specific areas significantly affected by high construction tender prices. The interview results indicate that the government is most impacted by high construction tender-price inflation. The impact of projects is equally overwhelming; however, contractors appear to experience more positive-impact though in the short term. The long-term

effects of high construction tender-price inflation were detrimental to all stakeholders by observation. The negative impacts were immediate and more severe to stakeholders like the government (client).

Table 12 Effect of high construction tender-prices

Interview quotes	Respondent's summary regarding impacts of high construction-tender prices
It is worrying, of course. Being in the industry, you see this is going on. Nevertheless, something is very worrying, so I feel we could do something about it to try to stop it in one way or another.	1. Unpredictable business environment 2. Reduced number of projects 3. Expensive projects 4. Reduced value for money 5. Compromise on quality of works
It is painful if you are a client because you can do fewer projects than you intended when developing your plans. It is unfortunate when you sit as a client because we are in a hurry to deliver infrastructure development.	1. Fewer projects than intended 2. Negatively affects the progression of economic development 3. Slow delivery of infrastructure development
It is double-sided; on one side, initially, it will look like it is a good thing because the prices are going up, giving room to generate more revenue. As prices rise on the other end, they become unsustainable and begin negatively affecting the country's overall economic growth.	1. Adoption of project implementation methodology 2. It affects the duration of the project
They are simply a response to rampant inflation.	1. Negatives effects on the national economy 2. Higher bid prices 3. The increased cost of construction
The soaring prices make the government fail to achieve most of its infrastructure programs because of inadequate budget provisions. Therefore, I think it is working against the government's will to provide infrastructure for the country	1. Negatively affects the management of contracts 2. Negatively affects the quality of works 3. Affects completion period 4. Causing government failure to achieve their infrastructure programs 5. Outstripping budget provisions
The increased prices in the construction sector are unfortunate. Nevertheless, I think there are many factors to contribute to that.	1. Difficulty in managing cash flows 2. Increases risk of delayed and non-payments 3. Unaffordable bids 4. Increases national debt burden 5. It leads to general poor governance in the infrastructure sector
Inflation in the country has a significant role to play regarding prices in Zambia. We are importing most of	1. Reduces the buying power of the client 2. Reduced number of projects 3. Reduced fiscal space for the client

Interview quotes	Respondent's summary regarding impacts of high construction-tender prices
the materials we use in the construction sector, so we import many inflationary problems.	4. Incomplete projects 5. Expensive projects
The rising prices affect the sector because it is challenging to see real growth despite considerable expenses.	1. Leading cause of unsustainable construction practices 2. Stiff competition 3. Increased number of players 4. Artificial level of prices 5. Corruption 6. Pilferage of information between bidders and the client 7. Stage-managed procurement practices 8. Encourages imbalanced pricing models
Zambia is probably in the higher 25% tier regarding high prices in the construction sector.	1. Emboldens poor project management practices 2. Outstripping government budget 3. Limits government expenditure and output 4. It affects the delivery of development 5. Translates into a lack of development
The high prices are due to the failure to utilize professionals when pricing most public projects.	1. Breeds grounds for disputes 2. Reduced number of projects leading to fewer players in the industry 3. Creates a negative ripple effect on employment creation and wealth creation for the nation
It affects everyone because even a competitive price should be at a level where the financiers, and the government, are comfortable for the business to continue. Therefore, if everyone overprices and the government starts to feel that they are not getting the best out of the sector, it loses the morale to keep financing the project. Even the communities do not appreciate the contractors because they think they are ripping off the government of taxpayers' money. High contracting prices are uncomfortable for the government and communities or the citizens.	1. High motivation for contractors 2. High productivity level 3. The government reduced morale in undertaking projects 4. Loss of community goodwill due to the perception that contractors are ripping-off government of value for money
Some professionals check those that can point out at the beginning that the prices are above the market prices.	1. It affects the scope of works 2. Budget overruns 3. Failure to complete other works 4. Poor quality of work 5. Failure to commence other works

Interview quotes	Respondent's summary regarding impacts of high construction-tender prices
The client is the most negatively affected because they are paying for projects, and it is difficult for them to budget due to projection challenges.	1. Expensive projects 2. Budget overruns 3. Loss of business by contractors
The construction sector is costly due to poor time management, resources, and projects. The price must be equal to the product and not influenced by non-project-related factors.	1. Stalled projects 2. Negative social perceptions 3. Incomplete projects 4. Expensive projects

Tender price controls for economic sustainability in construction

Respondents answered questions regarding identified tender price practices and controls for achieving economic sustainability in the construction sector. As a result, respondents agreed with the proposition of the study, as shown in Table 14. The results suggest that improving payment flows, providing contract clauses for price adjustments, and mitigating direct project-related costs are critical tender price controls for successfully implementing an economically sustainable construction sector. Other essential tender price controls include establishing technical rules, mitigating interest rate impacts, utilizing engineer's estimates, and mitigating inflation rate impacts. Overall, the study underscores thirteen tender price practices and controls for economic sustainability in the construction sector.

Table 14 Tender price practices and controls for economic sustainability in construction

Variable	Mean Rank	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Benchmarking price performance	11	4.09	1.020	1.040	-1.515	0.200	2.398	0.397
Improving payment flows	1	4.49	0.975	0.950	-2.377	0.200	5.372	0.397
Establishing technical & financial controls	4	4.29	0.944	0.890	-1.891	0.200	4.093	0.397
Utilizing engineer's estimates	6	4.27	1.055	1.114	-1.720	0.200	2.553	0.397
Legislating rate analysis		4.00	1.020	1.041	-1.216	0.200	1.336	0.397
Legislating regulations for Price reasonableness analysis	13	4.05	1.052	1.107	-1.434	0.200	1.876	0.397
Managing profit margin estimations	12	4.05	1.012	1.024	-1.195	0.200	1.223	0.397
Providing clauses for project variations/price adjustments	2	4.33	0.938	0.879	-1.760	0.200	3.450	0.397
Mitigating personnel/labor cost escalations	8	4.20	0.904	0.817	-1.643	0.200	3.554	0.397
Mitigating project-related costs	3	4.31	0.920	0.847	-1.627	0.200	2.717	0.397
Mitigating the impact of material-price escalations	9	4.20	0.934	0.872	-1.582	0.200	2.998	0.397
Mitigating inflation rate impacts	7	4.24	0.989	0.977	-1.617	0.200	2.529	0.397
Reducing imports	10	4.14	1.070	1.146	-1.464	0.200	1.722	0.397
Mitigating interest rate impacts	5	4.29	0.972	0.945	-1.781	0.200	3.382	0.397

DISCUSSION

The study finds that tender price ranked highly as the basis for an award of a construction contract. Hence, De Gouveia (2002) argues the need to address the challenges of price factor and its weighting in contract award with express provisions regarding its treatment. The study finds further that public institutions in developing countries face severe challenges from tender price

variability. This study finds that tender price variableness severely impacts infrastructure projects' financial sustainability. Tender price variableness critically cripples project finances, reduces government morale in undertaking projects, and contributes to the loss of community goodwill due to the perception that contractors rip off the government of value for money. The leading causes of tender price variableness include material costs; interest rates; equipment costs; labor costs; delayed payments; exchange rates; and the nature and type of project. Other causes include nature and level of competition, inflation rate, profit markup, political risks, character of client, and project management practices. The findings agree with Kissi, et al., (2017) regarding factors affecting Ghana's tender price. In addition, Beck & Walter, (2013) concluded that construction tender prices are influenced by varying regional determinants.

This study also established that tender price variableness leads to stalled projects, negative social perceptions by impacting the delivery of development, and incomplete and expensive projects. Other severe impacts include a reduced number of projects leading to fewer players in the industry and creating a negative ripple effect on the nation's employment and wealth creation. Tender price variability emboldens poor project practices that outstrip government budgets and limit expenditure and output. It makes it difficult for the client to manage cash flows increasing the risk of delayed and non-payments. Zhang, et al., (2015) state that tender price management is improtnat to clients for controlling project costs at bidding stage. Kissi, et al., (2021) echoed these sentiments, writing that construction tedner price remains a critical challenge to project stakholders. The study findings show that these unaffordable bid prices increase the national debt burden and poor governance in the construction sector. The client is the most negatively affected because they are paying for projects, and it is difficult for them to budget due to projection challenges caused by expensive projects. The study further finds that tender price variability and inflation are leading causes of budget overruns and ultimate loss of business to contractors in developing countries as the government loses appetite for expensive infrastructure development. The increased prices in the construction sector are unfortunate in developing countries as the rising tender prices affect the industry. It is challenging to see actual infrastructure development despite considerable expenses.

The study shows public infrastructure productivity plummets directly from tender price variability and inflation. If there is tender price variableness, the government starts to feel that they are not getting the best out of the sector, and it loses the morale to keep financing infrastructure projects. Even the communities do not appreciate the contractors because they think they are ripping off the government of taxpayers' money. Therefore, high contracting prices are uncomfortable for the government, communities, or citizens. The study finds that the inflation rate of the developing country has a significant role in tender prices. Developing countries import most of the materials they use in construction, so they import many inflationary problems. Inflationary problems reduce the client's buying power and constrain their fiscal space, resulting in expensive and incomplete

construction projects. It is a double-sided sword for contractors; on one side, initially, it will look like it is a good thing because the prices are going up, giving room to contractors to generate more revenue. As prices rise on the other end, they become unsustainable and negatively affect the country's overall economic growth forcing the government to slow its expenditure by abandoning perceived expensive construction projects. Ultimately tender price inflation erodes value for money and creates an unsustainable business environment.

CONCLUSION

Tender price is a major contextual independent factor that influences project success. High tender prices are a significant measure of the quality and type of competition. While also a sign of the low number of construction jobs because contractors price all risks patterning their existence in fewer projects on the market. Hence, the study ranks tender price significance highly in determining economic construction sustainability success. However, better cost control and financial planning are essential for addressing tender price variableness and inflation. The client's macroeconomic indicators and project management practices are significant areas of concern for addressing construction tender-price inflation. Contractors respond to poor project management practices and the client's unpredictability by adjusting to profit markup when developing tender prices. Contractors believe that increasing tender price is the way to address an erratic client and reduce or mitigate project-related risks. The study suggests determining benefits realizable from tender price level regarding the economic sustainability of construction is essential to the stakeholders. Tender price variability directly influences short- and long-term benefits to stakeholders and the construction sector.

Practical Implications

The findings in this study are consistent with the knowledge of project management practitioners in Zambia. However, these results have general applications in public-infrastructure sectors of most developing countries and can be used to mitigate the effects of tender price variableness and inflation. The study provides a quick overview of the tender price variability problem and its implications for Zambia's implementation of economic sustainability principles in construction. Managing tender price levels offers a better chance to improve sustainable construction.

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