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Impact of Globalization on Sustainable Implementation in the Construction Industry: Dynamics of Construction Tender-Price Volatility

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ABSTRACT: *Construction infrastructure plays a crucial role in development, bringing significant implications for resource utilization. Henceforward, specific measures for alleviating challenges associated with sustainable construction become crucial-general arguments of good industry practice. Construction-sector sustainability is increasingly important in developing countries, and threats of globalization amid construction-tender price volatility require immediate action. The purpose of this paper is threefold. The first is to investigate, through a literature review, the indicators of globalization concerning the construction sector. The second intention is to evaluate the empirical impacts of globalization on the construction sector with a focus on the derivation of construction tender-price. Thirdly, the study intends to separate the contributions of foreign direct investment (FDI) to global integration for construction sustainability. The study adopts qualitative and quantitative approaches that follow a case study and causal research design to explore and understand decisions and opportunities regarding construction-tender price inflation. The study utilizes content, thematic, and statistical methods for data analysis. The study finds that construction tender prices increased by an average of 49.7% per annum for periodic maintenance of feeder roads between 2012 and 2021, with varying correlations to globalization indicators. The research highlights notable disadvantages of foreign direct investments in the construction sector through the emergence of foreign firms in developing countries. The drawbacks include instigating unfair competition, initiating adverse knockout effects on local firms, exterminating local firms, and perpetuating corruption. In addition, the study identifies areas requiring attention to address the impacts of globalization in the construction sector. Critical areas include legislating procurement controls that protect local firms and improving the qualifications and competencies of local firms. The study further underscores mitigation measures against the adverse effects of foreign firms in the construction sector. These measures include providing training to local firms, managing the nature and type of competition, managing the nature and type of competing firms, and building the capacity of local firms.*

KEYWORDS: globalization, construction sustainability, tender price variableness, foreign direct investment, the construction sector

INTRODUCTION

Literature in the construction sector shows that foreign direct investment is responsible for making the construction industry more global, de-regulated, open, and competitive (Valence, 2002). Correspondingly, the literature findings of Naz & Ahmad (2018, p.147) show that critical drivers of globalization include human capital, labor, transportation and communication, and financial index. According to Uttam (2014), implementation strategies for sustainability in construction include strategic and project-level environmental impact assessments, green public procurement adoption, and stakeholder coordination improvement. Lately, Mjakuškina, et al. (2019) underscores significant contributing factors to providing high-quality work and ensuring sustainable project supervision to enhance collaboration between project stakeholders. Other factors include adopting new technologies, developing internal control systems, and developing industry-wide technology management capacities (Yilmaz & Bakis, 2015).

In Zambia, Foreign Direct Investment (FDI) increased by USD 426.30 million in the second quarter of 2019. It averaged USD210.07 million from 1998 until 2019, reaching an all-time high of USD1335.70 million in the third quarter of 2012 and a record low of USD-281.90 million in the first quarter of 2012, as seen in Figure 1 (Trading-Economics, 2022).

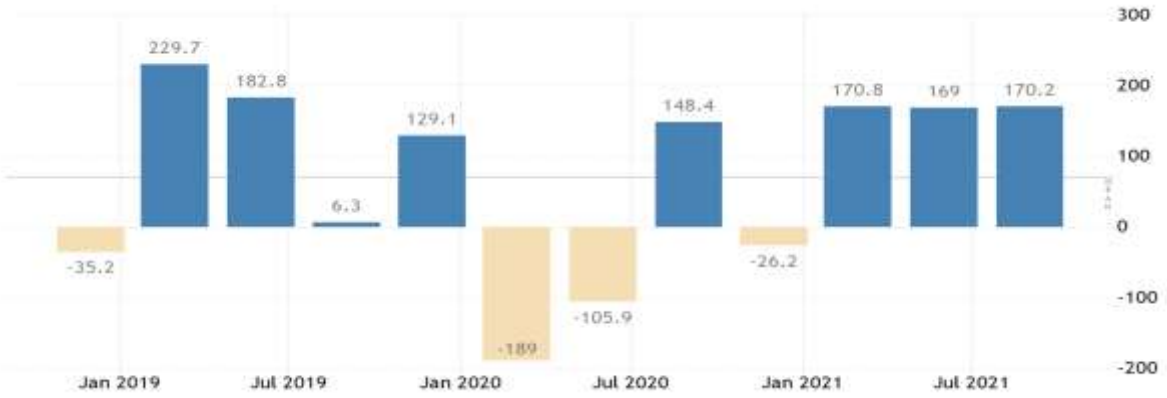

Fig. 1: Foreign Direct Investment in Zambia (*Source: Trading Economics*)

In Zambia, FDI has a crowding-out effect, mainly wiping out local construction firms in high-earning public projects. Because these foreign contractors have better access to financial resources, they create a welfare loss forcing the government to intervene through a 20% subcontracting policy of local firms. Maura and Forte (2010) found that the effects of Foreign Direct Investment on economic growth depend on the current level of development of the host country's internal socioeconomic, political, and cultural conditions. Since Zambia has weak conditions, it experiences the harmful effects of FDI, but the insistence on the positives of FDI makes political and economic philosophers blind to their impacts.

Construction-sector sustainability is increasingly important in developing countries, and perceived threats of globalization amid construction-tender price variability require immediate investigation. In Zambia, construction plays a crucial role in development and has significant implications for resource utilization. Hence, specific measures alleviating challenges associated with sustainable construction become crucial-general arguments for good industry practice. In this study, global

trends emphasize sustainable construction practices triggered by rapid economic growth and augmented environmental impact considerations (Plank, 2008; Hill & Bowen, 1997). The purpose of this paper is threefold. The first is to investigate, through a literature review, the indicators of globalization concerning the construction sector. The second intention is to evaluate the empirical impacts of globalization on construction with a focus on the derivation of bid price and overhead costs. Thirdly, the study intends to separate the contributions of foreign direct investment (FDI) to global integration in construction.

The paper also underscores the significance of adopting sustainable construction practices focusing on developing strategies that ensure maximum gains from globalization. In this area of study, there is no holistic examination of globalization through foreign direct investments to show its impact on Zambian construction sector performance. Preliminary findings show that FDI in the oil and gas industry did not lead to any productivity spillover; instead caused the Dutch-disease in the economy: an increase in the price of non-tradable goods (Nejati & Bahman, 2020). In addition, De Marchi, et al. (2013) finds that global competition threatens local industries disrupting local economic growth if local firms do not integrate internal factors such as structural characteristics and specific business strategies. Moreover, factors or variables affecting the cost of construction and tender-price volatility show dynamic interactions that are primarily dependent on the state of the economy. In practice, all costs are eventually passed on to tender price with demand shocks to the construction industry. Therefore, the significance of this study is enhancing government policy and strategies to mitigate critical economic factors that cause construction tender-price inflation and variability.

LITERATURE REVIEW

Globalization directly influences the nation's GDP, economic growth, FDI, economic crises, the advancement of technology, and the degree of international competition. This begins to impact the inflation rate, consumer price index, foreign exchange rate, interest rates, and imports and exports that contractors must consider when building their bid rates to determine bid pricing. Additionally, these factors affect sustainable implementation in the construction sector. In this literature review, the study considers sections and, firstly, undertakes to comprehend indicators of globalization in construction within the context of developing countries like Zambia. Secondly, the review focuses on understanding globalization's problems for developing countries. Thirdly, it investigates the effects of globalization on economic recessions, as these have a direct bearing on construction and its sustainable implementation. Lastly, the literature review explores the impact of globalization and price volatility dynamics on the construction sector.

Indicators of globalization in construction

There must be established reliable estimates and schedules to justify a construction project on economic grounds and provide the planned means of financing it. Infrastructure project that is

considered too expensive loses their economic justification (Stasiak-Betlejewska & Potkány, 2015). The construction industry is critical in the economy by providing demand for production and services from other economic sectors and assisting in achieving national socioeconomic development. Optimally, construction influences every sector of the economy; hence, the industry is likewise one of the many driving factors of economic growth (Oladinrin, et al., 2012). The construction sector can create employment and enhance economic efficiency, thereby contributing meaningfully to a country's gross domestic product (GDP). Wobowo (2009) argued that governments often manage their economies through construction to display funding availability and back up their decisions. Stasiak-Betlejewska & Potkány (2015) agree that infrastructure development is always affected by funding availability associated with technological, social, and economic aspects being indices of globalization and sustainability (Table 1).

Table 1 Globalization indicators in construction

Indicator(s)	Author
• Foreign Direct Investment (FDI) • Foreign workers • Economic openness • Capital intensity	Rahmah, et al. (2012)
• Material development • Project documentation and procedures • Technology • International companies	Ofori (2000)
High-rise or tall buildings (Increased construction activity)	Gültekin (2017)
• Economic reforms • Economic adjustment policies • Structural adjustment programs • Economic stabilization programs	Onyeonoru (2003)
• The dominance of market forces • Free market economy • Trade liberalization • Currency devaluation • Public sector structural reforms • Privatization • Democratization	Anugwom (2007)
• Economic dimension • Social dimension • Political dimension	Gygli, et al. (2019)
• GDP • GDP per capita • International Organizations • Peacekeeping missions • Embassies	Kudrle (2004)
International migration	Kahanec & Zimmermann (2008)

(Source: Made by the authors)

Problems of globalization for developing countries

Importantly, it is crucial to note that globalization affects different countries differently. Therefore, to quantify and qualify the impacts of globalization (Table 2) on a specific country, there is a need to describe other issues related to globalization, which Martens et al. (2014) highlight to include the dimension of globalization, measurement of globalization (the focus and unit of measure) and country-specific variables. Gygli, et al. (2019) agree that globalization indices begin to differ and take a more country-specific shape when you focus on its measurement and a country's policies, resources, institutions, and conditions.

Table 2 Impact of globalization on the construction sector

Impact(s)	Author	Observation	Response
• Reduction of barriers • Development of technologies • Adaptation of competitive strategies by local companies	Ristovska & A. Ristovska, (2014)	Possibility of premature intrusion into the domestic market to destabilize or suppress local competitors	Local companies can strategize to improve their competitive position
• Political changes • Social and environmental changes • Increased economic activities	Akiner & E. Akiner (2009)	Awareness is needed to embrace globalization	Set up an effective organization to monitor and evaluate the impact of globalization on local industry
• Workers' exploitation • Rising income inequality among workers • Increased involvement of foreign construction firms in local construction • Government's loss of control of economic and development sectors • Tendency towards de-industrialization	Anugwom (2007), Onyeonoru (2003)	Globalization marginalizes and impoverishes the recipient market	Need to regulate the activities of multinational companies significantly
• Economic crisis • Unemployment • Poverty • Pollution • Disruption of social cohesion & communities	Orzeață (2013)	Globalization has both winners and losers	Prepare well for globalization if everybody is to benefit from it
• Increased competition • Technological advancements	Ocloo, et al. (2014)	Globalization has brought increased competition from more prominent multinational firms with plentiful resources to the detriment of local SMEs' growth	Need to formulate effective competitive strategies

(Source: Made by the authors)

Since the main globalization feature is its supra-territoriality, measuring it at a national level suggests that it erodes national borders and reduces the importance of "economically small states" (Scholte, 2008). Martens, et al. (2014) argue for the importance of measuring globalization at a national level because national governments shape and affect the globalization process, and the data available is highest at the national level. Therefore, Gygli et al. (2019) categorize globalization (Table 3) to try to resolve some conflicting issues and areas of confusion.

Table 3 Dimensions of globalization (*Created by authors based on Gygli et al., 2019, p. 550*)

Dimension	Type of globalization	Description	Author
Social globalization	Interpersonal globalization	Global influence on social changes and interpersonal relations	Pawiak (2011)
	Informational globalization	Intensification of global links and modes of interaction	Lawlor (2007)
	Cultural globalization	Spread of values and standards of rationalism around the world	Raab et al. (2008)
	Technological globalization	Increase in technology exchange and increased skill level of IT workforce	Mayer (2000)
	Ecological globalization	the global level of environmental awareness and rationalized consumption	Ilić & Hafner (2015)
Economic globalization	Trade globalization	Openness to trade often reflected as a percentage of GDP	Gygli, et al. (2019)
	Financial globalization	Worldwide interconnectedness of capital markets	Castells (1999)
Political globalization	Military globalization	Globalized international systems into defense policy and military activity and operations	Tangredi (2003)
	Democratization	The global spread of democratic politics across countries	Nayyar (2015)

(Source: Made by the authors)

KoF Globalization Index (KOFGI) differentiates between de facto and de jure globalization, such as de facto globalization measures actual international flows and activities, and de jure globalization measures national policies and conditions. Bataka (2019) researched globalization and economic growth in sub-Saharan Africa and found that de jure globalization fostered economic growth while de facto globalization undermined it. At the same time, Yates (2007) and Thomas (2020) found that obstacles to globalization in the construction environment included language barriers, cultural misunderstandings, and variations in technical education.

Globalization and economic recession

Globalization was considered the leading cause of the 2008 global economic recession as it drove a sharp economic contraction in international capital flows in 2009 (Kose, et al., 2020). Like in construction, multinational corporations (MNCs) are the primary carriers of economic globalization, thereby organizing their operations and activities according to the principle of profit

maximization and reshaping national macroeconomic mechanisms (Shangquan, 2000). Shangquan (2000) agrees that developed countries play a much more dominant role in globalization. Despite a developed-country-concentrated global foreign direct investment collapse of 20% (falling from $1.5 trillion in 2019 to an estimated $859 billion), Africa's FDI (Figure 2) in the world largely remained insignificant (UNCTAD, 2021).

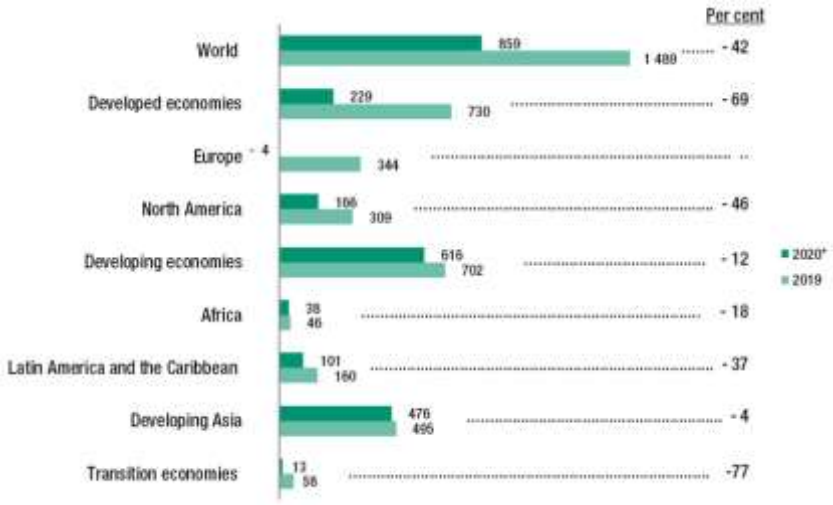

Fig. 2: FDI inflows by region, 2019 and 2020 (billions of US dollars) (*Source: UNCTAD, 2021*)

However, Kolodko (2001) argues that emerging market economies could catch up with the more advanced industrial economies in several generations in the broader setting of globalization. De Marchi, et al. (2013) found that global competition threatened local industries disrupting local economic growth if local firms did not integrate internal factors such as structural characteristics and specific business strategies. In contrast, Kahler (2013) found that despite the severity of the 2008 economic crisis, existing institutions of the global corporation became even more vital as they rebalanced their internal formulas for global influence aimed at increased policy coordination, surveillance, and financial regulation. As for emerging economies or developing countries, the impact of the globalization-induced economic crisis is too significant (Figure 3).

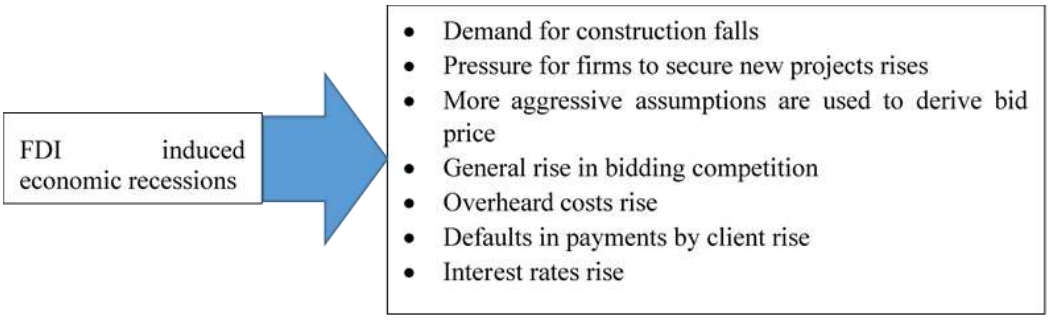

Fig. 3: Impact of economic recession on construction (Source: By the authors *Adapted from Pheng & Hou, 2019, p. 46*)

Impact of globalization and price volatility on the construction sector

Literature shows that the impacts of globalization are numerous (Table 3 and Figure 4) yet measurable and can be monitored using dynamic linear models. However, to improve the forecast performance, there is a requirement to include information about the external environment since globalization tends to diminish or deteriorate the accuracy of traditional domestic macroeconomic models (Reklaite, 2016). Despite the positives of globalization, Pettinger (2019) notes the ever-present argument that globalization gives more power to foreign firms to monopolize the local industry and charge high prices. In addition, higher levels of globalization do not automatically translate into higher quality, which correlates to business tax revenues (Potrafke, 2015). He further argues that economic globalization positively correlates to government spending, while social and political globalization negatively correlates to government spending in sub-Saharan Africa. According to Gygli, et al. (2019), KOF globalization index, the least globalized regions include Africa and Asia (Figure 5).

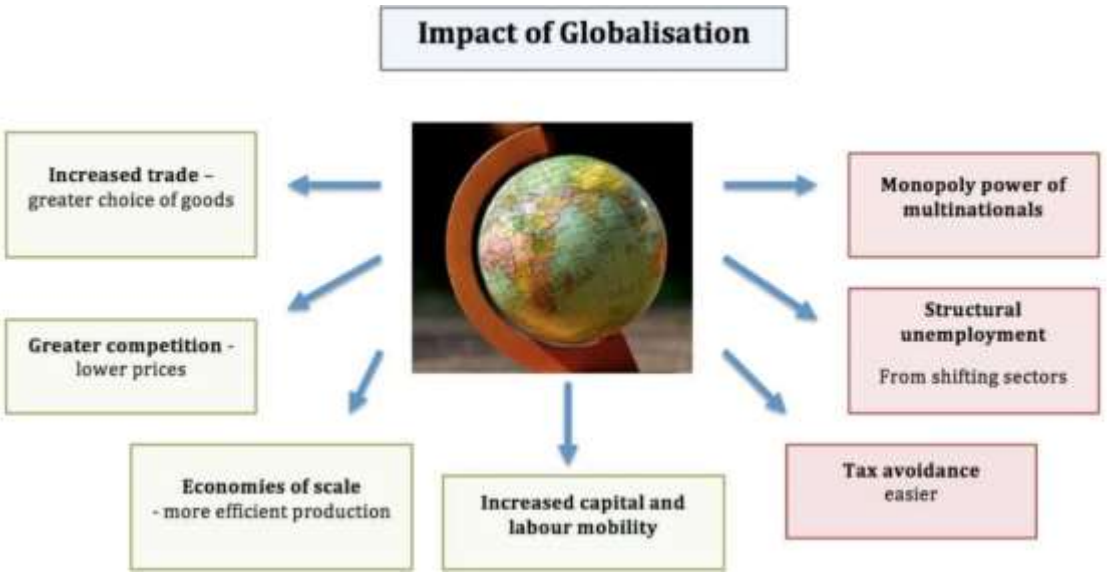

Fig. 4: Impact of globalization in the United Kingdom (*Source: Pettinger, 2019,* https://www.economicshelp.org/trade2/globalisation_uk_economy/)

According to this index and literature findings by Potrafke (2015), globalization has promoted economic growth, gender equality, and improved human rights. However, Gygli, et al. (2019) argues the urgent need to investigate and re-examine other significant consequences of globalization. There is a need to understand why globalization is proceeding more rapidly in countries such as Zambia than others, as shown in Figure 5. In 2018, Moreover, the president of the United States, Mr. Donald Trump, initiated tariff wars in a bid to push back on some "negative" effects of globalization. In the same year, the United Kingdom and the European Union successfully negotiated a withdrawal agreement, "Brexit." All these constitute the need to measure and investigate the effects of globalization in more detail (Gygli, et al., 2019). However, the most important is to be specific when holding the view that globalization is a dis-equalizing. Understanding and observing its negative impacts because while it may be a bad idea for one sector, it certainly may be an excellent idea for another. Adjusting and optimizing globalization in every industry in the direction of sustainability is fundamental (Martens, et al., 2010).

Fig. 5: Worldwide level of globalization in 2018 (*Gygli, et al., 2019*). Note: Dark-blue shaded areas indicate higher levels of globalization (According to this index, Zambia is at 57.79% globalization) (Source: https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html)

Musarat, et al. (2021) state that inflation significantly impacts the nation's economy. It is noteworthy that in a particular market economy, for example, one industry sector could be positively affected by inflation while another sector is not. Musarat, et al. (2021) found evidence of the devastating impact of inflation on the construction industry by highlighting the role of inflation in construction cost overrun (Figure 6). They recommend addressing inflation's effects by factoring it into the construction budget estimates at the project onset rather than at the later stages. Their research proved that the inflation rate influenced the construction industry by manipulating its growth rate through the performance of GDP and economic growth. As the inflation rate rises, it lowers the GDP and raises construction costs, raising construction prices. Further, Yu (2014) found a positive correlation between the inflation indices and construction output price indices such that as output prices of construction rose, the construction industry generally dropped.

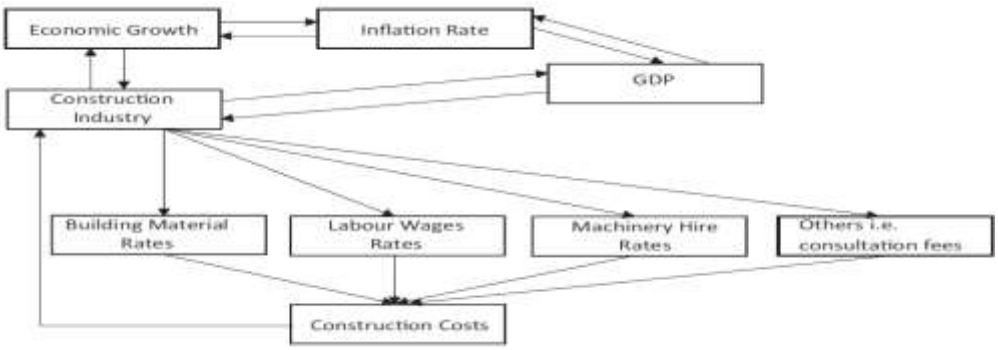

Fig. 6: Conceptual framework of the impact of inflation rate on the construction industry (Source: *Adapted from Musarat et al., 2021, p. 412*)

Globalization inspires open economies with dynamic markets and multifaceted but increasingly aggressive competition. Nguyen & Q. Nguyen (2020) researched five critical factors that affected construction price inflation: consumer price index, gross domestic product, basic interest rates, foreign exchange rate, and total imports and exports. They argue that construction price level is very informative on changes in the construction industry as it arises from a combination of results regarding labor, materials, and equipment cost variables. The price level in construction informs contractors about the orientation of the industry and the trends to follow. Nguyen & Q. Nguyen (2020) concluded that of the factors, the consumer price index exhibited the highest impact on the construction price level. Labor wages and price inflation show a dynamic interaction that is primarily dependent on the state of the economy and that, in practice, labor costs are passed on to price inflation with demand shocks to an industry eventually (Vansteenkiste, et al., 2019).

RESEARCH METHODOLOGY

The study is phenomenological-driven with qualitative and quantitative paradigms. Phenomenology is appropriate in this study because it aims not at measuring but at understanding the circumstances in a setting about a matter. In this study, phenomenology is essential to understanding circumstances surrounding the construction sector in Zambia; and drawing from experiences and factors that perpetuate price inflation. Further, the adoption of phenomenology is to understand from the point of view of construction sector actors. The study collates data to develop a preferred model that propels the sector into curtailing construction tender-price volatility. The adoption of phenomenology within qualitative research describes and interprets a phenomenon of interest. The study utilizes a directed content analysis of documents from a case study to offer more compelling evidence and a robust data set. The study reviews the Ministry of Local Government and Rural Development (MLGRD). It utilizes a qualitative data analysis approach of construction projects within case firms to develop averages of construction firms by examining various annual and audit reports. The analysis consists of directed, summative, and conventional content analysis. Based on existing information, the study identified 97 road construction projects from the case firm in directed content analysis. The study develops two coding categories of length and the tender price at this analysis stage, as shown in Table 5. Afterward, the investigation examines contracts based on these coding categories. The inquiry utilizes a conventional content analysis to identify project categories that comprise periodic maintenance of feeder roads. Further, it adopts a summative analytical design to calculate averages and draw comparisons with macroeconomic trend lines, as shown in Table 6.

The phenomenology technique allows the study to focus the collection of data on sector experts by asking questions through open-ended person-to-person interviews and observing the behavior of respondents. Correspondingly, the study adopts qualitative research that follows an exploratory design to explore and understand decisions and opportunities regarding construction-tender price inflation. The study utilized two interview questions. The first interview question analyzed descriptions regarding how globalization through FDI (existence of foreign construction firms on

the market) is considered when developing tender prices in construction. The second question sought feelings about global competition or the emergence of foreign construction firms on the market threatening the existence of local firms. This approach is essential in ensuring timely data collection and accuracy and gaining rich preliminary insights. Practical research shows that a qualitative sample of twelve interview participants was adequate to reach theoretical data saturation (Braun & Clarke, 2016; Boddy, 2016; Guest, et al., 2006). A purposive sample size of fourteen interview participants is sufficient, and the homogeneity of this cross-sectional study research population and scale of (Hennink & Kaiser, 2022).

The study utilizes a causal research design to collect and interpret primary quantitative data. The study achieves this by emphasizing structured-standardized questions with predetermined response options. The study packages questions in a self-administered questionnaire to 170 respondents. This selected design heavily relates to explaining the descriptive and casual nature of the study by providing specific facts for informed decision-making. It assists the survey in establishing different statistical relationships regarding construction-tender price inflation. The design includes generalizability advantages to the study, characteristic statistical rigor,nd a large sample of respondents (Eyisi, 2016). The study utilizes a proportionate stratification approach for determining sample size in each category due to the distinctive categorical nature of the population under consideration (Bless, et al., 2020; Sibanyama, et al., 2012). The sample size determination considers a margin of error of 5% and a confidence level of 95%. The study randomly selects actual participants following the determination of category samples from each category population. The derivations of the quantitative sample size for the self-administered questionnaire are 150 valid responses.

FINDINGS

The emergence of foreign firms means enhanced access to money, skills, technology, and knowledge for the construction sector. Table 9 discusses the advantages and disadvantages regarding the emergence of foreign firms through foreign direct investments in the construction sector specifically. The discussion develops in line with FDIs' influence on construction tender-price inflation. The study develops five thematic constructs to analyze the impact of emergence of foreign firms on the construction market. Table 4 categorizes emergent themes into skills and technology transfer, global competition, project management and delivery practices, resource access, and reputational damage. The research argues some of the notable disadvantages (Table 4) of foreign direct investments, which include:

1. Foreign firms cause unfair competition
2. Foreign firms can undercut prices and absorb losses to make it uncompetitive for local firms.
3. Foreign firms have an unfair advantage because they are state-owned enterprises with immense and unlimited resources and have access to cheap loans or money that they can borrow from their countries

4. Foreign governments subsidize foreign firms heavily: making them strong enough to have a negative knockout effect on local firms.
5. Foreign firms are an active component of unhealthy competition because they have a lot of financial influence to tip the scales and erode intended benefits and encourage harmful vices such as corruption
6. The competition brought about globalization, and the emergence of foreign firms exterminates especially emerging local firms. After that, they increase tender prices systematically to meet huge expenses associated with managing a foreign firm
7. Foreign firms have a level of capacity to perform (much better than local firms) and compete (better than local firms), thereby perpetrating the perception that local contractors are non-performers

Correspondingly, the research argues some of the notable advantages (Table 4) of foreign direct investments, which include:

1. Foreign firms help build the capacity of local firms when competition is well regulated
2. Foreign firms complement the local firms and help transfer technology when well regulated
3. Foreign firms are Fundamental for skills transfer if well harnessed
4. Foreign firms possess the capacity to deliver projects on time and to the required quality
5. An increase in foreign competitiveness may help stabilize construction tender prices over time
6. Foreign firms easily meet stringent international-level pre-tender requirements
7. Foreign firms can use their finances to execute the project

The research notes some problems with globalization. The issues include failure to compete as they face higher costs in developing their manufacturing industries, loss of economies of scale due to cheap imports, and little scope for economic growth. Other challenges include de-industrialization as multinationals force out local competition and the highest skilled labor leaving for developed countries.

Table 4 Advantages and disadvantages of the emergence of foreign construction firms

1. Theme: Skills & technology transfer			
Participant ID	**Thematic construct**	**Advantage**	**Disadvantage**
PS1	Reserve specific jobs for local firms and ensure that foreign firms go into joint ventures every time they tender	• Help build the capacity of local firms when competition is regulated	• Cause of unfair competition
SS2	I think that global firms are supposed to complement local firms if competition is level	• It would help complement the local firms and help transfer technology when well regulated	• They are state-owned enterprises with immense and unlimited resources • They can undercut prices and can absorb losses to make it uncompetitive to local firms • They have an unfair advantage because they have access to cheap loans or money they can borrow from their countries.
SS3	It is dependent on how the recipient harnesses that situation. The ability to tap into foreign-frim expertise can help build local capacity through knowledge and technology transfer	• Fundamental for skills transfer if well harnessed	• They have a lot of financial influence to tip the scales and erode intended benefits.
1. Theme: Global competition			
Participant ID	**Thematic construct**	**Advantage**	**Disadvantage**
SS1	We buy services from them (foreign construction firms) because of their competence, pre-exposure to works of similar nature, and	• Deliver projects on time and to the required quality	• Component of unhealthy competition

	massive capital outlays that enable them to deliver projects on time and to the required quality.		
PS2	High prices in the sector make it attractive for foreign firms to come and undertake projects	• An increase in foreign competitiveness may help stabilize prices over time	• Their strength has a negative knockout effect on local firms
PS9	Global competition is good, but the construction industry in Zambia is facing unfair competition		• Foreign firms are usually assisted by their governments
PS8	We should not be afraid of foreign competition if the competition is fair.	• Push local firms to adapt quickly to international norms	• Foreign firms are heavily subsidized by their governments • Agents of unfair competition
2. Theme: Project management and delivery practices			
Participant ID	**Thematic construct**	**Advantage**	**Disadvantage**
PS3	If you are competing from an even playing field, then it is evident that the local contractors will lose out		• They encourage vices such as corruption
PS7	We see a lot of infrastructure in the country without participating in any of them. They come as investors, yet we do not realize any investment	• They have ready access to external financing	• They have support from their governments which guarantees them an unfair advantage • Only use local firms to rubber stamp what they are doing without tangible skills transfer

PS6	Globalization poses a real threat as it threatens local firms due to their lack of exposure and understanding of the dynamics of survival	• Can meet stringent international-level pre-tender requirements	• The competition brought about globalization and the emergence of foreign firms exterminates especially emerging local firms
SS5	It is expensive to bring in expertise from a foreign country		• They increase prices to meet huge expenses associated with managing a foreign firm
3. Theme: Access to resources			
Participant ID	**Thematic construct**	**Advantage**	**Disadvantage**
PS4	• There is a pattern suggesting that foreign construction firms have better access to finances		• Have better advantages over local firms
PS5	• Any industry needs a healthy dose of competition for it to be competitive. However, in Zambia, we have overlooked the challenges of local contractors in preference for foreign contractors • They have had good grooming and incubation protected by their governments at some point for them to grow.	• Can use own finances to execute the project.	• Local firms lack the level of capacity to perform and compete with foreign firms
4. Theme: Reputational damage			
Participant ID	**Thematic construct**	**Advantage**	**Disadvantage**
SS4	Local financial institutions shy away from financing local contractors, so if you introduce foreign firms with more foreign financial capabilities to take on jobs	• They have a better capacity to outperform and outcompete local firms	• They perpetuate the perception that local contractors are non-performers

(Source: Made by the authors)

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The documentary review deliberately focuses on the periodic maintenance of feeder roads. It is because this area of public construction has few foreign firms in practice; hence an investigation would yield impacts of FDI that are not so obvious. A documentary review of case study firm indicates that the average annual percentage increase of construction tender-prices for periodic maintenance of feeder roads between 2012 and 2021 is 49.7% per annum (Table 5). The study reviewed 97 contracts for routine maintenance of roads from the case firm. Figure 7 shows bar charts of annual average construction tender prices for unpaved (feeder) roads.

Moreover, Table 6 shows a positive correlation between construction tender prices to the foreign exchange rate, commercial interest rate, and external debt stock. However, there is a negative correlation between construction tender prices and foreign direct investment. The graphs confirm a positive trend line or a steady increase in construction tender prices in the period (2012-2021).

Table 5 Construction Tender-Prices for periodic maintenance of feeder roads (2012-2021)

Year	2012		2013		2014		2015		2016	
	Km	Tender Price	Km	Tender Price	Km	Tender Price	Km	Tender Price	Km	Tender Price
	31.1	3,602,336.00	52	90,654,684.40	38	38,484,042.65	50	29,377,586.00	12.3	6,500,774.68
	67.7	3,687,002.00	8	1,986,040.71	15	5,228,837.46			58	34,899,588.23
	57.2	6,534,268.00	7.7	4,104,000.00	14	5,422,655.97			40	44,655,304.32
	41.1	2,470,591.00	20.5	11,296,647.24	47.8	13,879,176.12			95	63,615,299.00
	28	3,602,335.57	12.7	5,303,000.00	8	3,190,957.00			54	46,833,110.94
	55	3,236,650.56	12.3	4,911,000.00	4	1,203,035.13			91.5	69,927,528.90
	32	2,831,444.00	9.4	5,809,000.00	14	6,248,041.67			36	26,918,990.00
	175.8	49,115,527.72	6.4	3,322,228.40	23	6,006,621.67			38	47,484,042.65
	18	1,479,358.44	82	26,108,525.12	17	4,591,480.56			58	34,899,588.23
	55	12,311,865.61	12.5	5,116,849.32					24.5	69,927,528.90
	15	4,931,395.48	18	7,320,348.20						
			3.8	2,453,505.56						
			2.3	2,486,636.90						
Average	52.35455	8,527,524.94	19.04615	13,144,035.83	20.08889	9,361,649.80	50	29377586	50.73	44,566,175.59
ZMK/Km		162,880.32		690,114.97		466,011.33		587,551.72		878,497.45

Year	2017		2018		2019		2020		2021	
	Km	Tender Price	Km	Tender Price	Km	Tender Price	Km	Tender Price	Km	Tender Price
	70.9	108,415,598.13	30	74,061,380.18	83	91,295,870.00	53	100,856,437.86	21	35,880,675.40
	55	57,737,462.42	29.3	69,950,583.11	17	19,693,457.81	42	66,885,061.25	16	24,294,384.56
	12.3	11,761,113.13	83	88,267,870.42	42	48,756,183.30	60	70,108,544.00	21.6	35,787,669.46
	45	76,925,272.28	40	42,372,750.00	80	93,998,709.02	37.5	46,501,969.80	24.6	35,465,358.24
	57	78,561,606.97	33	36,738,694.08	110	124,819,468.40	45	58,605,602.00	24	95,902,918.23
	10	24,997,391.58	83	88,267,870.42	50	74,335,140.24	29.9	46,753,597.00	61.8	95,902,918.23
			33	55,130,702.88	45	58,702,533.24	33	40,162,355.20	22	31,469,143.70
			37.6	42,372,504.34	44	56,651,170.16	46	57,108,663.10	21.6	35,787,669.46
			43.6	56,774,458.20			60	70,420,192.50	44.5	53,424,968.51
			27	44,461,293.70			58	118,291,479.20	24	55,825,258.52
			32	53,822,751.20			60	128,298,370.88	20	30,644,894.50
			64.1	75,999,351.12			50	97,395,937.26	50.8	62,329,581.22
			70.9	124,214,192.00			50	69,979,215.60	50	59,929,627.17
Average	41.7	59,733,074.09	46.65385	65,571,877.05	58.875	71,031,566.52	48.03077	74,720,571.20	30.91538	50,203,466.71
ZMK/Km		1,432,447.82		1,405,497.78		1,206,480.96		1,555,681.34		1,623,899.15

(Source: Made by the authors)

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Figure 7 shows a steady increase in construction tender prices between 2012 and 2021. For periodic maintenance of feeder roads, tender prices increased from an average construction tender price of ZMW162,880.3/km in 2012 to an average of ZMW1,623,899.1/km in 2021. Between 2012 and 2021, tender prices for periodic maintenance of feeder roads increased by an average of 49.7% per annum. For unpaved roads (routine maintenance), construction tender prices increased by ZMW1,461,018.8/km from ZMW1,438,825.8/km in 2012 to ZMW1,623,899.1/km in 2021. The results in Table 6 indicate an average percentage increment per annum of 49.7% of construction tender prices. It shows a tender-price increment of 899% over the ten years under review. The data confirms a positive trend line or a steady increase in construction tender prices in the period (2012-2021). Moreover, results show a positive correlation of construction tender prices to foreign exchange rates (0.80), inflation rates (0.26), commercial interest rates (0.75), and external debt stock (0.90) (Trading-Economics, 2022). However, there is a negative correlation between construction tender prices and foreign direct investment (FDI) of -0.80.

Table 6 Correlation between macroeconomic indicators and tender prices for periodic maintenance of feeder roads

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Averages	Coefficient (r) Pearson's	Comments
Tender-price (ZMW'million/km)	0.162880	0.690115	0.466011	0.587552	0.878497	1.432448	1.405498	1.206481	1.555681	1.623899	1.00	-	-
Forex rates	5.14	5.39	6.15	8.63	10.31	9.54	10.45	12.91	18.28	20.05	10.69	**0.80**	strongly positive
Inflation rates	6.6	7	7.8	10	18.2	6.6	7.5	9.1	15.7	22.1	11.06	**0.26**	weakly positive
Interest rates	19.1	16.3	18.7	21.1	28.1	26.9	24	25.6	26.8	25.7	23.2	**0.75**	moderately positive
FDI (US $'Bn)	1.73	2.1	1.51	1.58	0.66	1.11	0.41	0.55	-0.17	0.19	1.0	**-0.80**	strongly negative
External Debt (US $'Bn)	0.92	2.13	5.02	8.08	9.21	12	12.1	15.05	16.45	17.7	9.9	**0.90**	strongly positive
%Change in Interest rates	0	-14.7	14.7	12.8	33.2	-4.3	-10.8	6.7	4.7	-4.1	**+4.3 %**	-	-
%Change in Forex	0	4.9	14.1	40.3	19.5	-7.5	9.5	23.5	41.6	9.7	**+17.3 %**	-	-
%Change in inflation	0	6.1	11.4	28.2	82.0	-63.7	13.6	21.3	72.5	40.8	**+23.6 %**	-	-
%Change FDI	0	21.4	-28.1	4.6	-58.2	68.2	-63.1	34.1	-130.9	-211.8	**-40.4 %**	-	-
%Change in Debt	0	131.5	135.7	61.0	14.0	35.2	-2.8	24.4	9.3	7.6	**+46.2 %**	-	-
%Change in TP	0	323.69	-32.47	26.08	49.52	63.06	-1.88	-14.16	28.94	4.39	**+49.7 %**	-	-

(Source: Made by the authors)

Table 6 shows the relationship between average annual construction tender prices and macroeconomic indicators. Construction tender prices showed a reduction in 2018 and 2019—however, they increased by 28.9% in 2020. The study finds the highest average tender-price increment in 2013 at 323.69%, followed by a reduction of -32.5% in 2014. The study calculates

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the average construction tender-price increase over this period to be at least 49.7%. At the same time, the macroeconomic indicators (independent variables) are observed to increase minimally at 4.3% (interest rates), 17.3% (Forex), and 23.6% (inflation rate). Government debt increased by 46.2%, while FDI was reduced by -40.4%. The FDI Pearson's value of -0.80 is a strong negative correlation: an increase in FDI correlates with a decrease in construction tender prices. However, the correlation may not imply direct causation between FDI and construction tender prices. The strong negative correlation suggests that under circumstances where all other categorical causes of construction, tender-price inflation were eliminated or reduced. The negative slope indicates high FDI values correspond to low construction tender prices. However, other macroeconomic variables or indicators of globalization: inflation rate (0.26), forex (0.80), interest rates (0.75), and external debt (0.90) show positive correlations to construction tender –prices. An increase in these indicators may lead to increases in construction tender prices. Figure 7 shows that tender prices for periodic maintenance of feeder roads increased from an annual average construction tender price of ZMW162,880.3/km in 2012 to a yearly average of ZMW1,623,899.1/km in 2021. The study presents findings of FDI categorical variables affecting construction tender prices in Table 3: and further presents results regarding mitigation measures against the effects of globalization through FDI in Table 7.

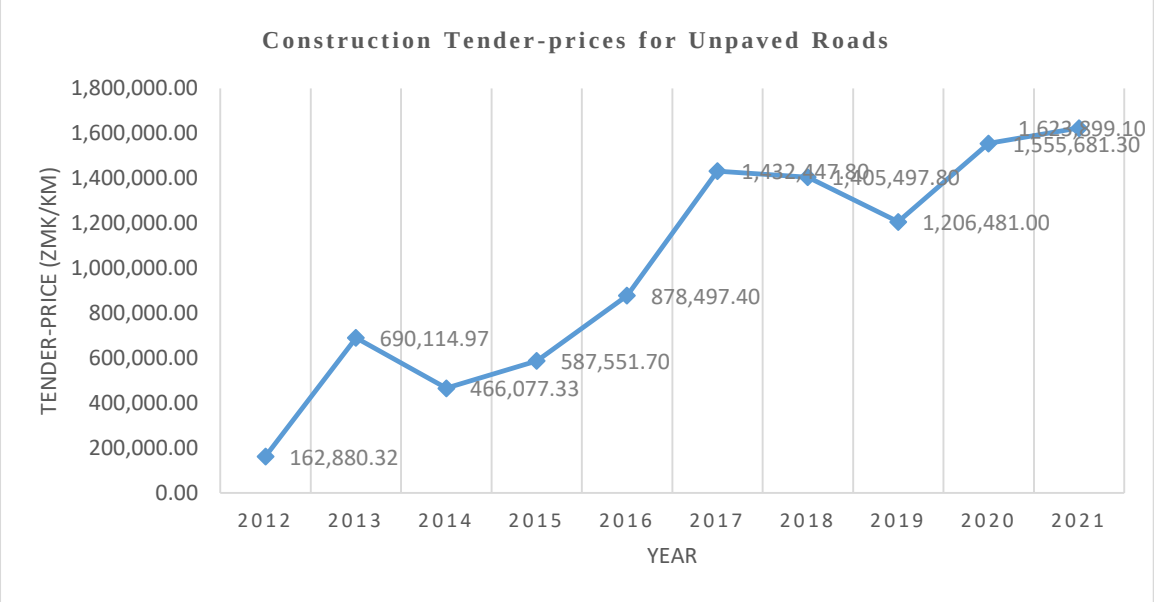

Fig. 7: Average construction tender prices for periodic maintenance of feeder roads (Source: Made by the authors)

The means for all 27 statements were more significant than 3.5 as shown in Table 7. The study uses the mean to describe and represent the center of the data sets. The analysis indicates that the

data sets have mean values ranging from 3.99 (lowest mean of the data set) to 4.35 (highest mean of the data set) for a Likert range of one ("strongly disagree) to five ("strongly agree"). These typical values indicate that the data's center points fall within the ranges of agreeing and strongly agreeing that specific dimension strategies stated could yield lower construction tender prices. For this nominal distribution, 67% of the standard deviation values fall within one standard deviation of the mean, while 100% fall within two standard deviations of the mean, as shown in Table 7. Table 7 establishes positive kurtosis values ranging from 1.708 to 5.372. These kurtosis values significantly deviate from zero, indicating that the data is not normally distributed. The kurtosis values between -2 and +2 are acceptable in proving univariate normal distribution. The study further reveals the mitigation measures against the effects of FDI. Primary mitigations measures against the harmful effects of the existence of foreign firms in the construction sector include providing training to local firms (M=4.35, R=1), managing the nature and type of competition (M=4.35, R=2), addressing the nature and type of competing firms (M=4.33, R=3), and building the capacity of local firms (M=4.29, R=4). Other construction-related mitigation measures identified by the study include mitigating interest rate impacts (M=4.29, R=5), developing knowledge of procurement processes among local contractors (M=4.28, R=6), developing project implementation methodology (M=4.28, R=7), Ensuring knowledge transfer from foreign firms (M=4.28, R=8) and managing number of competitors (M=4.27, R=9).

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Table 7 Descriptive analysis and standard one sample t-test analysis for mitigation measures against effects of FDI

Variable	Rank	Mean	Std. Deviation	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
		Statistic	Statistic			Lower	Lower
Legislating procurement controls	21	4.14	0.963	0.927	0.000	3.98	3.98
Legislating subcontracting policy & joint venture agreements	16	4.20	0.970	52.096	0.000	4.04	4.04
Improving the technical ability of local contractors	18	4.17	0.909	52.481	0.000	4.02	4.02
Improving the qualification and competence of the contractor	23	4.12	0.827	55.595	0.000	3.99	3.99
Developing resource capabilities of local firms	25	4.08	0.983	60.455	0.000	3.92	3.92
Managing profit margin estimations by local firms	26	4.05	1.012	50.353	0.000	3.89	3.89
Improving stakeholder management of local firms	13	4.22	0.856	48.568	0.000	4.08	4.08
Developing project implementation methodology	7	4.28	0.858	59.724	0.000	4.14	4.14
Developing knowledge of the procurement process among local contractors	6	4.28	0.809	60.441	0.000	4.15	4.15
Mitigating the impact of material-price escalations	14	4.20	0.934	64.124	0.000	4.05	4.05
Ensuring the protection of local firms	17	4.19	1.009	54.504	0.000	4.03	4.03
Mitigating inflation rate impacts	11	4.24	0.989	50.349	0.000	4.08	4.08
Reducing imports in construction	20	4.14	1.070	51.981	0.000	3.96	3.96
Encouraging ownership of equipment	24	4.09	1.091	46.849	0.000	3.91	3.91
Managing the number of competitors	9	4.27	0.953	45.426	0.000	4.11	4.11
Mitigating interest rate impacts	5	4.29	0.972	54.253	0.000	4.13	4.13
Managing nature and type of competition	2	4.35	0.948	53.446	0.000	4.19	4.19
Managing the nature and type of competing firms	3	4.33	0.982	55.575	0.000	4.17	4.17
Ensuring knowledge transfer from foreign firms	8	4.28	0.890	53.526	0.000	4.13	4.13
Providing training to local firms	1	4.35	0.941	58.312	0.000	4.19	4.19
Building capacity of local firms	4	4.29	0.922	56.003	0.000	4.14	4.14
Ensuring market predictability for local firms	19	4.16	0.907	56.383	0.000	4.02	4.02
Removing industry uncertainty for local firms	15	4.20	0.914	55.658	0.000	4.06	4.06
Instilling sector confidence in local firms	22	4.13	0.953	55.788	0.000	3.97	3.97
Mitigating exchange rate impact	27	3.99	1.030	52.544	0.000	3.83	3.83
Alleviating effects of the existence of foreign firms	12	4.23	0.987	46.989	0.000	4.07	4.07
Ensuring supply chain management	10	4.26	0.951	51.994	0.000	4.10	4.10

(Source: Made by the authors)

The positive kurtosis values indicate leptokurtic distribution in which data follows a t-distribution (Table 7). Table 7 shows the statistical significance of all variables with 'Sig.' values less than 0.05. Importantly, since the p-values in the 'Sig.' column are less than 0.05, the study adopts these strategies as mitigation measures against the adverse effects of foreign direct investments. Table 7 indicates skewness values for the variables that range from -1.172 to -2.377. It means a highly left-skewed distribution since the values are all less than -1.00. Therefore, the distributions are not normal because they exhibit skewness and kurtosis values that exceed guidelines for normal distribution. In Table 7, the study ranks the variables according to their means. Finch (2022) agrees that the mean ranking of variables reflects how popular the research sample found the item. These lower standard deviation values indicate a lesser spread in the data. The coefficient of variation (CV=standard deviation/mean) of less than one shows relatively low variation; therefore, the distribution of the dataset is of low variance. The data set has much less variability than its mean.

DISCUSSION

The study findings indicate a relationship between globalization and construction sector performance. Based on the literature reviewed in this paper, this study developed a theoretical framework (Fig. 8) to display a better understanding of this relationship. Many factors affect the construction price index at tendering. Chief among them include machinery, construction materials, and the skill-set level of the labor force and its wages. In the theoretical framework, globalization directly influences the nation's GDP, economic growth, FDI, economic crises, the advancement of technology, and the degree of international competition. It begins to impact the inflation rate, consumer price index, foreign exchange rate, interest rates, and imports and exports that contractors must consider when building their bid rates to determine bid pricing. Schilling, et al., (2018) agreed with these findings that governments must understand factors for sustainable-construction success and manage sustainable construction by integrating stability, resilience, and adaptability dimensions. This study emphasizes that the success of sustainability approaches in construction depends on individuals' and groups' actions as they define dynamic structures, processes, and system functions. Further, this study argues that sustainable construction depends on comprehending three specific aspects: drivers for sustainable construction, resistance or barriers to sustainable construction, and initiatives for achieving sustainable construction.

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. Recently, Plummer & Van Poeck (2021) observed that in some cases, the change process could be radical and disruptive while subtly incremental and smooth in others. This study's findings show that sustainable construction implementation can assist in generating improvements in procurement ways consistent with advancing development. However, one significant component of sustainable construction implementation lies in developing local strategies informed by regional scenarios. The process requires understanding country-specific sustainability challenges followed by appropriate policy and regulatory changes. Söderholm, (2020) agrees that the state's role in designing and developing appropriate policy mixes in the construction-sector context needs to be emphasized.

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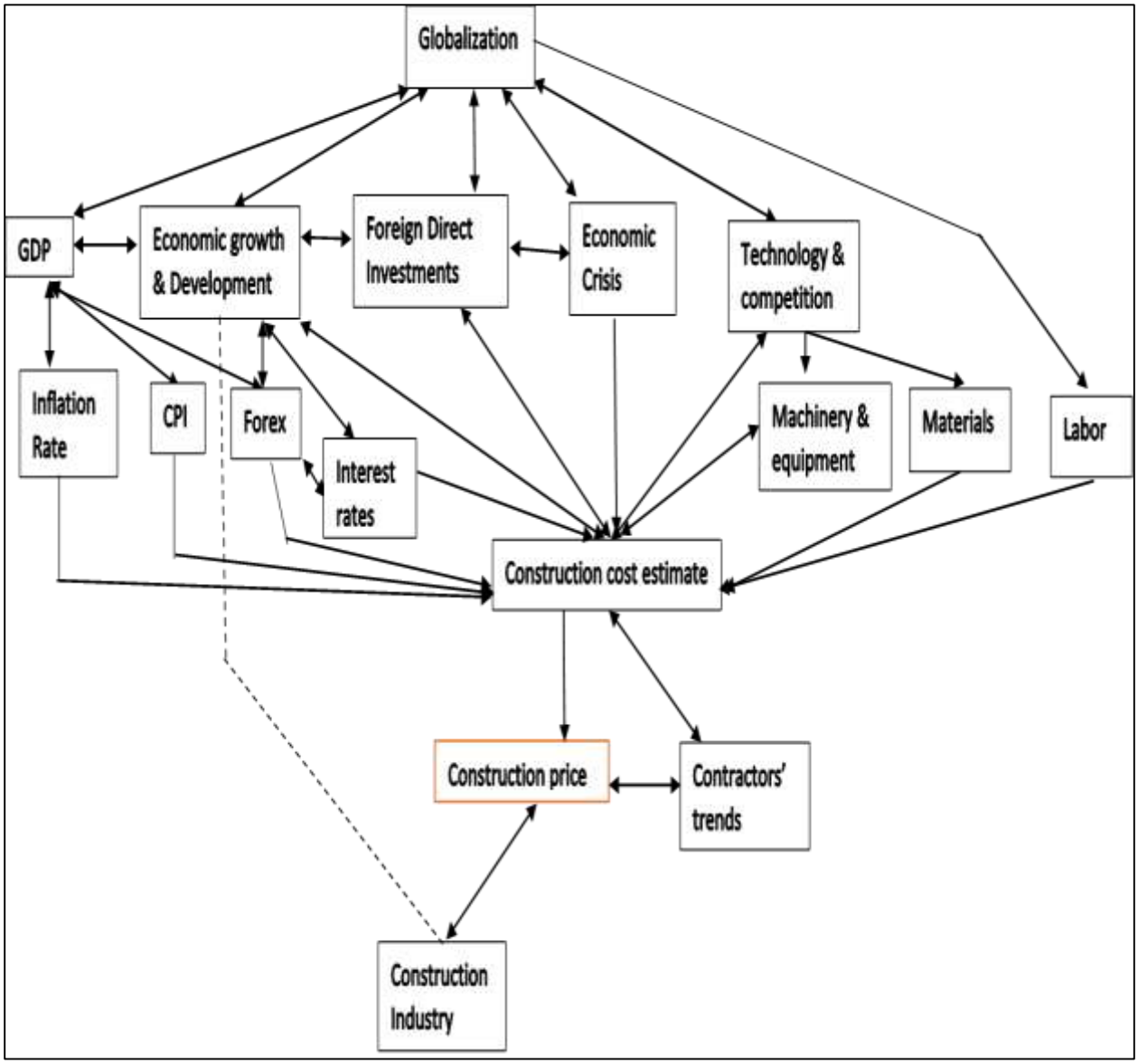

Fig. 8: Theoretical framework of the impact of globalization on construction price (*By authors based on the literature reviewed: Musarat et al., 2021, Nguyen & Q. Nguyen, 2020, Vansteenkiste, et al., 2019, and Yu, 2014*)

The study agrees that construction sustainability implementation approaches fail because they are not sector driven. The study argues that sustainable implementation approaches must be country-specific rather than concentrated on attempting to respond to extraordinary grand challenges such as climate change, poverty, degradation, etcetera. Markard et al. (2020) confirm that sustainability challenges are most often associated with broader governance issues requiring vertical and horizontal alignments between multiple sectoral policies. These alignments may require a more interventionist approach considering various interventions such as regulating business, developing novel systems, reorienting public-economic activities, reorienting cultural and political power, and establishing a more decisive role of government in shaping market sectors. This study insists on interventionist approaches that require understanding context-specific sustainable construction principles. Congruently, the paper develops a flowchart appropriate for enhancing economic sustainability consideration in construction sector (Figure 9). The flowchart summarizes three approaches required to domesticate investigation and navigate challenges associated with sustainable implementation in construction. These approaches allow the possibility to generalize solutions to facilitate and accelerate the implementation of context-specific sustainability practices:

1. identify local economic principles that drive sustainable construction
2. utilize an understanding of context-specific barriers to developing practical strategies, and
3. develop sustainability assessments to ensure compliance with sector policy and regulation

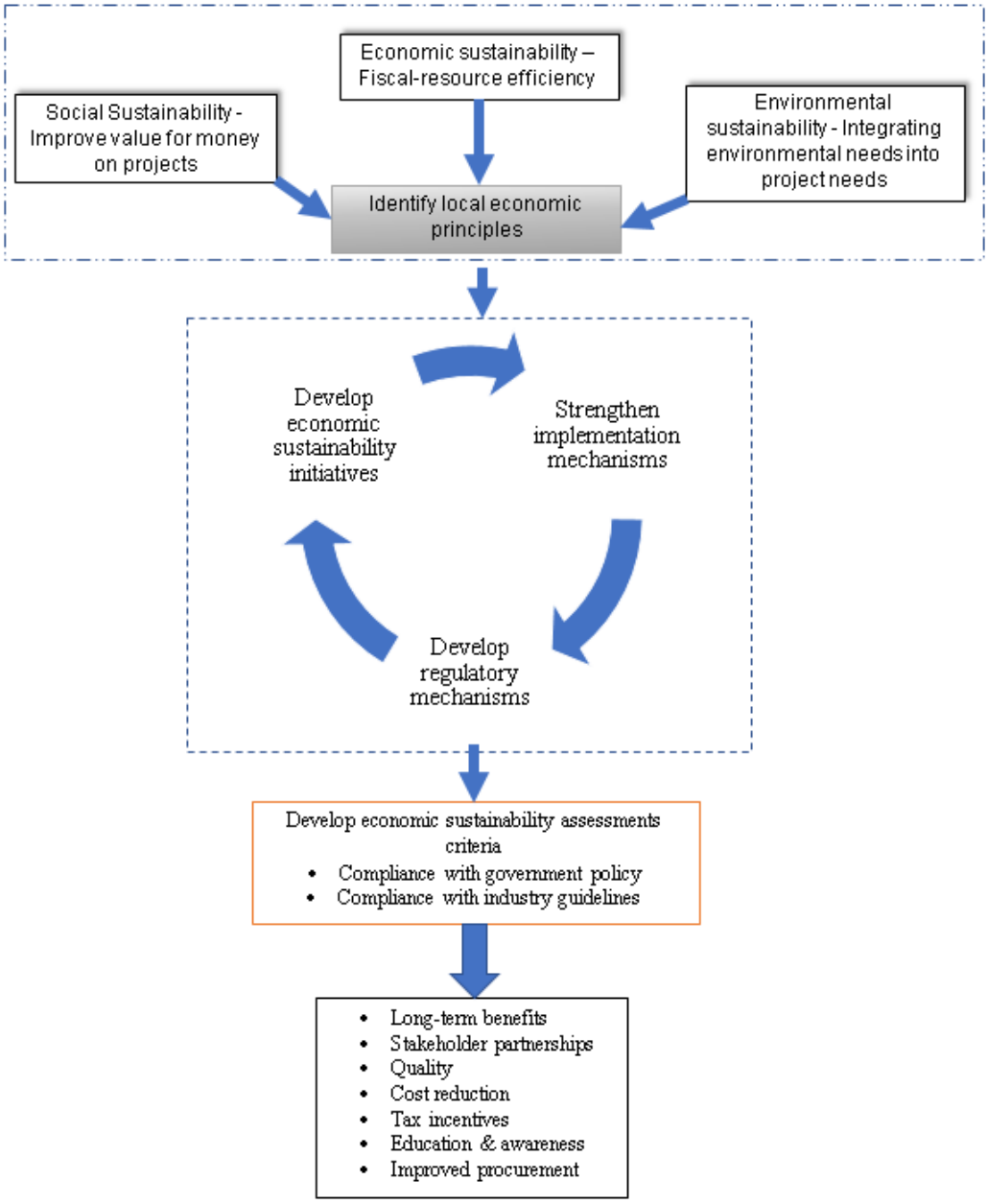
Economic sustainability – Fiscal-resource efficiency
Social Sustainability - Improve value for money on projects
Environmental sustainability - Integrating environmental needs into project needs
Identify local economic principles
Develop economic sustainability initiatives
Strengthen implementation mechanisms
Develop regulatory mechanisms
Develop economic sustainability assessments criteria
Compliance with government policy
Compliance with industry guidelines
Long-term benefits
Stakeholder partnerships
Quality
Cost reduction
Tax incentives
Education & awareness
Improved procurement

Fig. 9: Flowchart for developing economic sustainability in construction (Source: made by the authors based on the literature reviewed: Hill & Bowen, 1997, Lowe, et al., 2003; Akadiri, et al., 2012; Al-Yami & Price, 2006; Oke, et al., 2019; Zulu, et al., 2022; Díaz-López, et al., 2021)

CONCLUSION

Effects of FDI through the presence of foreign construction firms on the local market are severe on the survival of local firms if not mitigated. Globalization and its effects differ from country to country and require country-specific interventions. The study examines the impact of globalization on the construction sector by identifying globalization indicators. The study's findings support previous researchers' work that no single measure can effectively address the effects of FDI, and no singular indicator is responsible for causing corresponding adverse effects. The study further observes that the effects of FDI require weaving together deliberate strategies to benefit local construction firms. The recommendation is that construction project teams in developing countries be aware of globalization's adverse effects to minimize them in construction. In addition, government and construction project teams should practice identified measures of reducing negative globalization impacts and enhancing sustainable construction, such as ensuring the protection of local firms, reducing imports in construction, encouraging ownership of equipment among local firms, improving the qualification and competence of contractors and developing resource capabilities of local firms. Considering that there are various solutions to the challenges of globalization to the sustainability of the construction industry, there is a need to provide a model that proposes a collective practical solution to eminent and country-specific construction sector globalization and sustainability challenges.

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