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Framework to Manage the Impacts on the Contractor's Budget for Construction Projects Due to the Economic Crisis in Sri Lanka

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ABSTRACT

While several studies have separately investigated the management of the contractor's budget and the impact of the economic crisis in Sri Lanka, the novel contribution of this study lies in its unique exploration of the synergy between these two crucial areas. Therefore, this study aimed to assess how to manage the impacts of the economic crisis on the contractor's construction budget in Sri Lanka This research study successfully identified the factors influencing the contractor's budget amid the economic crisis in Sri Lanka, along with effective solutions to mitigate these impacts. For that, the qualitative approach with semi-structured interviews using experts for the data collection through three qualitative Delphi rounds was used. The collected data were analyzed using manual content analysis. In there, twenty-three (23) significant factors as factors affecting the contractor's budget due to the economic crisis in Sri Lanka, eleven (11) effects of the economic crisis on the construction industry in Sri Lanka, and eighteen (18) solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget were identified. Finally, a framework was developed based on the findings which will hold significant value for Contractors as that provides valuable insights and practical measures to counter the challenges posed by the economic crisis on construction projects.

1.0 INTRODUCTION

The budget of a creation undertaking plays a main position in cost management, financial control, and economic sources handling of the project (Bhattacharya et al., 2019). It is the maximum amount of money the owner is willing to spend on design and construction with a view to making the mission financially feasible, as stated by Malathi et al. (2022). Kadri and Sugara (2017) referred to that project budgets are the cash allotted to carry out a project and the project cost performance will be evaluated against the allotted finances. Although the client's perspective is frequently considered whilst discussing the finances, the contractor's finances should also be considered (Amini et al., 2022).

The contractor's budget includes Construction expenditures and associated owner expenses (Towey, 2017). The contractor's budget should be in keeping with the general budget for the construction project, and any modifications to the contractor's budget will influence the total project budget (Shoar et al., 2023). Specifying the timely completion of projects within budget and to the extent of fine by using the completion of projects is an indicator of successful project completion (Rahman et al., 2013). A few factors, which consist of modifications in personal necessities, the outside environment, and inner circumstances, influence the contractor's budgets during the project period (Hiroshan & Hadiwattege, 2014). The contractor needs to handle the budget successfully if the undertaking is to prevail (Lee et al., 2014), but this delicate balance can be considerably bothered if unexpected troubles arise (Mwangi, 2016).

The construction industry is one of the main sectors affected because of the economic crisis (Mucci et al., 2016). Kirman (2010), defined that an economic crisis is characterized with the aid of an unforeseen situation that poses a large risk to the employer's pinnacle precedence values, necessitating a quick response. It has the ability to ripple via many sectors and feature a massive impact on economic activities, livelihoods, and social well-being (Castells et al., 2012). Due to the symbiotic hyperlink between the economic stability of the country and the construction industry, an economic downturn may also result in a cascade of troubles for the construction industry (Musarat et al., 2021).

Additionally, the economic crisis significantly impacts the construction industry and the contractor's budget (Edmund et al., 2018). According to Nazeeruddin and Baig (2022), Sri Lanka's construction industry has been appreciably impacted by the current economic crisis. A wide variety of construction projects have also been appreciably behind schedule or suspended as a result of the economic crisis in Sri Lanka (Jayamal et al., 2023). Many causes, including significant loans with high interest rates, changes to tax guidelines, and a declining tourism enterprise, are liable for the Sri Lankan economic crisis (Sriyani, 2022).

However, as this is the first time Sri Lanka has had a severe economic crisis (Jayamal et al., 2023), the connection between the prevailing economic crisis and contractor budget management previously obtained much less attention. As a result of the industry needs and existing literature gap deficit, a study on managing the impacts on the contractor's budget for construction projects during the economic crisis in Sri Lanka is desired. Therefore, the aim of this study is to research the way to manage the impacts on the contractor's budget for construction projects due to the current economic crisis in Sri Lanka. To achieve the aim of this study, four (04) objectives have been set up: identify the effects of the economic crisis on the Sri Lankan construction industry, identify factors affecting the contractor's budget due to the economic crisis in Sri Lanka, propose suitable solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget, and develop a framework to manage the impacts on the contractor's budget due to the current economic crisis in Sri Lanka. The effects of this study influence the construction industry by successfully dealing with the effects on the contractor's budget amid the economic crises.

2.0 LITERATURE REVIEW

2.1 Contractor's budget

A budget serves as a pivotal element within the control structure of the organization (Van Roestel, 2016), as it assumes the vital responsibility of planning and managing the income and expenses of the organization (Ashworth & Perera, 2015). According to Ji et al. (2019), budgeting effectively translates the plans and objectives of the organization into quantifiable financial terms. As stated by Towey (2017), in the realm of construction projects, direct stakeholders wield substantial influence over the construction budget.

Consequently, the Contractor emerges as a key stakeholder in the budget preparation and cost-related endeavors (Idrees & Shafiq, 2021).

The contractor's construction budget holds paramount significance within the overarching framework of the project budget (Alavipour & Arditi, 2018). It is typically created early in the project planning process as it is used to establish overall project cost estimates (Norul Izzati et al., 2019). As stated by Anysz and Rogala (2019), the contractor's construction budget is used to monitor the overall financial performance of the project and ensure that it stays within the agreed financial parameters. Detailed and precise contractor budgets facilitate effective project planning, informed decision-making, and cost avoidance (Towey, 2017). Inaccurate contractor's budget during the construction phase and incomplete design information lead to additional costs, while client design changes pose risks to Contractors (Del Pico, 2023). Hence, maintaining an accurate contractor's budget is crucial for overall project success and financial stability in the construction industry (Memon et al., 2014).

2.2 Key factors affect the Contractor's budget

In the realm of construction budget analysis, several authors have delved into the identification of factors that influence the construction budget. Among these authors, Al-Juwairah (1997) identified a comprehensive list of forty-two (42) factors affecting the construction budget. Similarly, Memon et al. (2010) identified twenty-four (24) factors that significantly affected the construction budget. Expanding on this body of knowledge, Kasimu (2012, as cited by Hiroshan & Hadiwattege, 2014) synthesized and consolidated the diverse factors that affect construction budgets into five (05) major categories as environment factors, construction parties-related factors, construction items-related factors, cost-estimating factors, and financing factors. Furthermore, Memon et al. (2010) calculated the mean of the factors affecting the construction budget and identified the most significant factors that affect the construction budget.

2.3 Effects of the economic crisis on the Sri Lankan construction industry

The review of the economic crisis reveals it as a period of unexpected and profound trade, giving upward thrust to completely new structures (Babu & Sudhakar, 2016). It is a sudden occasion that confronts corporations, posing a widespread hazard to their centre values, necessitating quick responses (Supriadi & Pheng, 2018). According to the National Bureau of Economic Research (NBER) (2012), an economic recession is a duration of declining economic activities that spreads across the financial system, lasting more than a few months and is clear in real Gross Domestic Product (GDP), actual income, employment, industrial manufacturing, and wholesale-retail income. Furthermore, Sharma et al. (2022) stated that during economic crises, adhering to normal recurring processes becomes difficult because of the magnitude of the challenges faced.

The duration of the economic crisis that transpired in Sri Lanka between 2019 and 2022 yielded a myriad of essential issues which include mismanagement of the economy, an increase in foreign debt, declining foreign reserves, currency depreciation, and growing prices (George et al., 2022). According to Sharma et al. (2022), Sri Lanka has an extreme economic crisis due to the decline of foreign reserves which results in a shortage of essential goods and services together with medicine, gas, and cement.

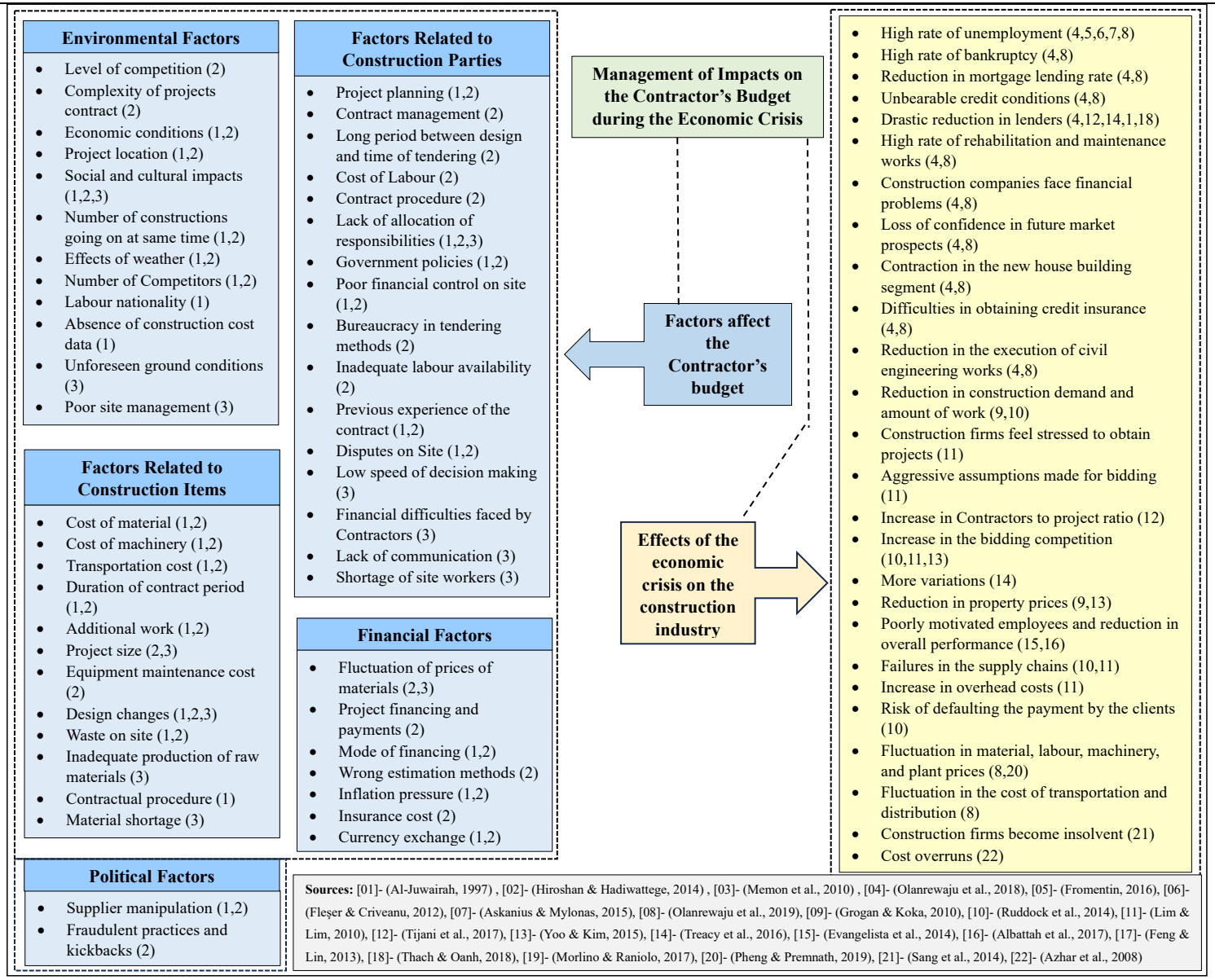

Figure 1. Summary of factors that affect the contractor's budget and effects of the economic crisis on the construction industry

Due to prior difficulties with fuel and electricity shortages and chronically excessive inflation rates, the current economic crisis in Sri Lanka contrasts with another country's history (Matthias & Jayasinghe, 2022). According to Perera and Waidyasekara (2013), an economic crisis can result in direct consequences for the construction industry. Further, the construction industry has been hit harder by way of the economic crisis than other sectors (Ruddock et al., 2014). As a result, the contraction is broadly diagnosed as a recession that results in a substantial drop in the key financial indicators (Moore-Cherry & Vinci, 2012). In there, the outcomes of the economic crisis on the construction industry are diagnosed by numerous authors. According to Zuo et al. (2015), understanding the character of economic crises is vital for growing effective strategies to mitigate their consequences and enhance economic stability and growth.

Figure 1 illustrates a summary of literature findings on factors that affect the contractor's budget and the effects of the economic crisis on the construction industry.

2.4 Necessity of the research

The significance of the study lies in addressing the critical need to understand how economic crises can impact the contractor's budget in the construction industry. While previous studies have explored budget management and economic crises separately, no research study has been conducted examining the intersection between economic crises and the contractor's budget management. For instance, while Lai (2010), Yismalet and Alemu (2018), and Tzenios et al. (2022) highlighted the importance of budget management in the construction industry, Gamil and Alhagar (2020), Fadhil and Burhan (2021), and Nistorescu and Ploscaru (2010) only focused on the impacts of the economic crisis on the construction industry. Therefore, it depicts the need to have research uniquely examine the intersection between the economic crises and the contractor's budget management. to fill the existing literature gap. Further, economic crises can arise unexpectedly (Wenzel et al., 2020), disrupting any sector including the construction industry. According to Edmund et al. (2018), budget management in the construction industry has been significantly impacted by the economic crisis. Therefore, it is needed to have a better understanding among industry practitioners of how to manage the contractor's budget successfully amid economic crises. Considering the above-mentioned literature gap and industrial need, it is vital to conduct research to investigate how to manage the impacts on the contractor's budget in construction projects due to the economic crisis.

3. METHODOLOGY

Given the specific nature of the data required for this study, a qualitative approach was chosen over quantitative or mixed methods. As outlined by Bryman (2017), the qualitative research approach enables a comprehensive exploration of the opinions, experiences, beliefs, and attitudes held by a specific group of individuals while allowing for an in-depth investigation of emerging concepts through research. As this study required the experiences of experts and observation-based solutions to investigate how to manage the impacts on the contractor's budget for construction projects due to the current economic crisis in Sri Lanka, the study followed a qualitative approach. This approach was selected to address the research question, to answer the research question, "How to manage the impacts on the contractor's budget for construction projects due to the current economic crisis in Sri Lanka?". Answering this question required the involvement of multiple subject area experts. The Delphi methodology has found extensive application across different contexts, particularly when there is a need for expert knowledge for informed decision-making or to gain deeper insights into a particular phenomenon (Brady & O'Connor, 2014; Shane, 2015). Therefore, for this study, the Delphi technique was adopted as it offers a valuable means to gather the opinions of experts in a specific field (Mansour et al., 2022). By adopting the Delphi method, the study aimed to obtain the most consensus-driven

perspectives from a group of Experts concerning a particular area of interest (Osuna et al., 2019). While a three-round Delphi is typical, single, and double-round Delphi studies have also been completed (Ameyaw et al., 2016). According to Xia and Chan (2012), conducting three Delphi rounds is required to make a proper conclusion. Therefore, three Delphi rounds were carried out for this study.

3.1 Delphi Round I

The primary purpose of Round I was to validate and, if necessary, make modifications to the literature findings that corresponded to the identified following two phases:

Phase 01: Identifying the effects of the economic crisis on the construction industry

Phase 02: Identifying the notable effects of the economic crisis on the Sri Lankan construction industry

3.2 Delphi Round II

The primary purpose of Round II was to determine factors impacting the contractor's budget specifically, within the context of Sri Lanka, focusing on the subsequent phases of research:

Phase 01: Identifying the factors affecting the contractor's budget

Phase 02: Identifying the notable factors affecting the contractor's budget due to the economic crisis in Sri Lanka

3.3 Delphi Round III

The confirmed results from Experts in Round II served as a crucial basis for devising solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's construction budget.

Phase 01: Proposing suitable solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget

Consequently, the fulfilment of the third objective ensued as an extension of the findings obtained from Delphi Round III.

To ensure a comprehensive exploration of the research subject, qualitative researchers often employ the purposive sampling technique, which allows for the identification of individuals who can provide in-depth insights (Ernawati et al., 2022; Klar & Leeper, 2019). Therefore, a purposive sampling technique is used to find twelve (12) Experts from the fields of construction, offering flexibility in generalizing the findings despite having a relatively small sample size and reducing sample randomness (Sharma, 2017). The selection process involved filtering respondents based on both mandatory and additional qualifications specified in **Table 1**. To ensure the richness of data (Ames et al., 2019), the chosen sample consisted of individuals with a minimum of 10 years of experience in construction organizations or at least 5 years of experience in handling contractor budgets or those with relevant experience in working during the current economic crisis. By employing this carefully selected sample, the research aimed to gather valuable insights and in-depth perspectives on the impact of the economic crisis on the contractor's budget.

Table 1. Expert Selection Criteria and Profiles

Coding for interviewee	Designation	Selection criteria						Participation		
		Compulsory Qualification			Additional Qualifications (Expert must satisfy at least two qualifications)			R1	R2	R3
		At least 10 years of experience in contraction organization	At least 5 years of experience in contractor's budget handling	Having experience in work during the current economic crisis	Having construction-related degree	Having construction-related professional qualification	Having a construction-related post-graduate degree			
IE1	Project Manager	✓	✓	✓	✓	✓		✓	✓	✓
IE2	Senior Quantity Surveyor	✓	✓	✓	✓	✓	✓	✓	✓	✓
IE3	Project Quantity Surveyor	✓	✓	✓	✓	✓		✓	✓	
IE4	Quantity Surveyor	✓	✓	✓	✓	✓		✓	✓	✓
IE5	Deputy General Manager	✓	✓	✓	✓	✓		✓		
IE6	Director	✓	✓	✓	✓	✓		✓	✓	
IE7	Deputy Agent Manager	✓	✓	✓	✓	✓	✓	✓	✓	✓
IE8	Quantity Surveyor	✓	✓	✓	✓	✓		✓	✓	✓
IE9	Project Manager	✓	✓	✓	✓	✓		✓	✓	✓
IE10	Project Quantity Surveyor	✓	✓	✓	✓	✓		✓	✓	✓
IE11	Project Quantity Surveyor	✓	✓	✓	✓	✓		✓		
IE12	Quantity Surveyor	✓	✓	✓	✓	✓		✓	✓	✓
IE13	Contract Manager	✓	✓	✓	✓	✓	✓	✓	✓	✓
IE14	Senior Quantity Surveyor	✓	✓	✓	✓	✓	✓	✓	✓	✓

As highlighted by Saunders (2014), content analysis is a widely employed method for analyzing qualitative data, enabling researchers to derive meaningful insights from the content of the data. Therefore, the manual content analysis was chosen for this study, as it offers researchers the opportunity to gain a comprehensive and nuanced understanding of the data (Lynch et al., 2021).

4.0 FINDINGS AND ANALYSIS

The findings of the study are presented under three (03) sub-sections; the effects of the economic crisis on the Sri Lankan construction industry, factors affecting the contractor's budget due to the economic crisis in Sri Lanka, and suitable solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget.

4.1 Effects of the economic crisis on the Sri Lankan construction industry (Round I Phase 01 and Round I Phase 02)

This section presents the findings derived from Round I Phase 01, and Round I Phase 02 of the study. Initially, a literature review identified twenty-seven (27) effects of the economic crisis on the construction industry, as demonstrated in **Table 2**. Subsequently, through expert interviews in Round I Phase 01, eight (08) effects were universally accepted from the literature, while three effects were merged into one, and two effects were consolidated into a single effect. As a result, a total of twenty-one (21) effects were identified as the impacts of the economic crisis on the Sri Lankan construction industry by the conclusion of Round I Phase 01. In Round I Phase 02, ten (10) effects were omitted due to insufficient responses from experts, not meeting the 75% response cutoff. Following Delphi Round I Phase 02, eleven (11) significant effects were identified as the effects of the economic crisis on the Sri Lankan construction industry, as demonstrated in the 'bold' text. This iterative process of refining the identified effects through expert consensus in Delphi Round II has led to a more focused and robust understanding of the specific impacts of the economic crisis on the construction sector in Sri Lanka.

The loss of confidence in future market prospects stands out as a pivotal factor affecting the Sri Lankan construction industry during the current economic crisis. IE8 stated that "the prevailing economic crisis has instilled a sense of caution among investors, prompting them to withhold their investments from Sri Lankan projects. As a result, people are feeling less sure about how the market will perform in the future". Further elaborating that, IE2 emphasized that there are not many larger government construction projects planned for the next two or three years, except for those that involve funding because of complexity arising from the incessant escalation of prices.

The unbearable credit conditions and difficulties in obtaining credit insurance have emerged as interconnected challenges, with various interviewees confirming their adverse impact on the Sri Lankan construction industry. According to IE4, though suppliers and purchasers used to agree on a credit period, for settling payments after receiving goods in the past, given the existing economic crisis, suppliers have shifted away from offering credit periods which causes a direct strain on available funds. Interestingly, high rates of bankruptcy is also identified by all interviews as an effect of the current economic crisis to the Sri Lankan construction industry. Elaborating that, IE5 pointed out that, the bankruptcy of suppliers disrupts the construction supply chain, leading to cash flow problems and potentially compromising project quality due to reliance on limited suppliers. Further, IE2 highlighted that this situation creates high investment risk, project suspensions, and Client concerns about receiving value for money paid in advance.

Table 2. Effects of the economic crisis on the Sri Lankan construction industry

Effect Code	Effects of the Economic Crisis	Findings from the Literature	Round I Findings	Round II Findings (Agreement more than 75%)
E1	**Unbearable credit conditions**	✓	✓	✓
E2	**Loss of confidence in future market prospects**	✓	✓	✓
E3	**Difficulties in obtaining credit insurance**	✓	✓	✓
E4	**Failures in the supply chains that include the subcontractors and suppliers**	✓	✓	✓
E5	**Increase in overhead costs**	✓	✓	✓
E6	**Fluctuation in material, labour, machinery, and plant prices**	✓	✓	✓
E7	**Fluctuation in the cost of transportation and distribution**	✓	✓	✓
E8	**Cost overruns**	✓	✓	✓
E9	**High rate of rehabilitation and maintenance works**	✓	✓	✓
E10	**High rate of bankruptcy**	✓	✓	✓
E11	**Poorly motivated employees and reduction in overall performance**	✓	✓	✓
E12	Contraction in the new house building segment	✓	✓	-
E13	Reduction in construction demand and amount of work	✓	✓	-
E14	Reduction in the execution of civil engineering works	✓	✓	-
E15	Aggressive assumptions made for bidding	✓	✓	-
E16	High rate of unemployment	✓	✓	-
E17	Increase in the bidding competition	✓	✓	-
E18	Construction firms become insolvent	✓	✓	-
E19	Increase in Contractors to Project ratio	✓	✓	-
E20	Reduction in property prices	✓	✓	-
E21	Reduction in mortgage lending rate	✓	✓	-
E22	High rate of unemployment	✓	-	-
E23	Funding sources are affected and a drastic reduction in lenders	✓	-	-
E24	Construction firms feel stressed about obtaining projects	✓	-	-
E25	More variations to the agreed scope of work and requests to accelerate project completion	✓	-	-
E26	Increase in overhead costs	✓	-	-
E27	Risk of defaulting the payment by the clients	✓	-	-

Note: Following Delphi Round I Phase 02, eleven (11) significant effects were identified as the effects of the economic crisis on the Sri Lankan construction industry, as demonstrated in the 'bold' text.

The fluctuation in material, labour, machinery, and plant prices and the fluctuation in the cost of transportation and distribution are also frequently highlighted by interviews as adverse effects on the Sri Lankan construction industry. IE7 and IE9 pointed out that those effects underscore the challenge of maintaining cost predictability and financial stability. Supporting that, IE5 stated that, as the construction industry is significantly reliant on imported materials, accounting for approximately 60% of its resources, the government-enforced import restrictions intensify the operational efficiency of the construction industry.

4.2 Factors affecting the contractor's budget due to the economic crisis in Sri Lanka (Round II Phase 01 and Round II Phase 02)

The findings from Round II Phase 01 and Round II Phase 02 are presented in this section. At the end of the literature review, fifty (50) factors were identified as factors affecting the contractor's budget as demonstrated in **Table 3**. Subsequently, through expert interviews in Round II Phase 01, forty-three (43) factors were universally accepted from the literature, while four factors were merged into one, and three factors were consolidated into a single factor. As a result, a total of forty-five (45) factors were identified as factors affecting the contractor's budget due to the economic crisis in Sri Lanka by the conclusion of Round II Phase 01. In Round II Phase 01, twenty-seven (27) factors were omitted due to insufficient responses from Experts, not meeting the 75% response cutoff. Following Delphi Round II Phase 01, twenty-three (23) significant factors were identified as the factors affecting the contractor's budget due to the economic crisis in Sri Lanka, as demonstrated in the 'bold' text. This iterative process of refining the identified factors through expert consensus in Delphi Round II has led to a more focused and robust understanding of the specific factors affecting the contractor's budget during the economic crisis in the construction sector in Sri Lanka.

The research findings revealed a comprehensive array of factors influencing the contractor's budget, categorized into environmental, construction parties-related, construction items-related, financial, and political factors.

Table 3. Factors affecting the contractor's budget due to the economic crisis in Sri Lanka

Factor Code	Factors affecting the contractor's budget	Findings from the Literature	Round I Findings	Round II Findings (Agreement more than 75%)
	ENVIRONMENTAL FACTORS			
F1	**Complexity of project contract**	✓	✓	✓
F2	**Economic conditions**	✓	✓	✓
F3	**Number of constructions going on at the same time**	✓	✓	✓
F4	**Absence of construction cost data**	✓	✓	✓
F5	Level of competition	✓	✓	-
F6	Social and cultural impacts	✓	✓	-
F7	Effects of weather	✓	✓	-
F8	Unforeseen ground conditions	✓	✓	-
F9	Poor site management	✓	✓	-
F10	Project location	✓	-	-
F11	Number of Competitors	✓	-	-
F12	Labour nationality	✓	-	-
	FACTORS RELATED TO CONSTRUCTION PARTIES			
F13	**Project planning**	✓	✓	✓
F14	**Contract management**	✓	✓	✓
F15	**Long period between design and time of tendering**	✓	✓	✓
F16	**Government policies (Rules and Regulations)**	✓	✓	✓
F17	**Poor financial control on site**	✓	✓	✓
F18	**Previous experience of the contract**	✓	✓	✓

cont'd…

cont'd…

F19	Contract procedure	✓	✓	-
F20	Cost of Labour	✓	✓	-
F21	Relationship between management and labour	✓	✓	-
F22	Low speed of decision making	✓	✓	-
F23	Lack of communication among parties	✓	✓	-
F24	Bureaucracy in tendering methods	✓	✓	-
F25	Lack of coordination and allocation of responsibilities between Designers and Contractors	✓	✓	-
F26	Disputes on Site	✓	✓	-
F27	Cash flow and financial difficulties faced by Contractors	✓	✓	-
F28	Inadequate labour availability	✓	-	-
F29	Shortage of site workers	✓	-	-
	FACTORS RELATED TO CONSTRUCTION ITEMS			
F30	**Cost of material**	✓	✓	✓
F31	**Cost of machinery**	✓	✓	✓
F32	**Transportation cost**	✓	✓	✓
F33	**Duration of the contract period**	✓	✓	✓
F34	**Additional work**	✓	✓	✓
F35	**Equipment maintenance cost**	✓	✓	✓
F36	**Design changes**	✓	✓	✓
F37	**Inadequate production of raw materials by country**	✓	✓	✓
F38	Contractual procedure	✓	✓	-
F39	Material shortage	✓	✓	-
F40	Size of the project	✓	✓	-
F41	Waste on site	✓	✓	-
	FINANCIAL FACTORS			
F42	**Fluctuation of prices of materials**	✓	✓	✓
F43	**Wrong estimation methods**	✓	✓	✓
F44	**Inflation pressure**	✓	✓	✓
F45	**Insurance cost**	✓	✓	✓
F46	**Currency exchange**	✓	✓	✓
F47	Project financing and payments	✓	✓	-
F48	Mode of financing, bonds, and payments	✓	✓	-
	POLITICAL FACTORS			
F49	Fraudulent Practices and kickbacks	✓	✓	-
F50	Supplier manipulation	✓	✓	-

Note: Following Delphi Round II Phase 01, twenty-three (23) significant factors were identified as the factors affecting the contractor's budget due to the economic crisis in Sri Lanka, as demonstrated in the 'bold' text.

The complex landscape of budget preparation reveals the compelling significance of factors such as the complexity of project contracts, economic conditions, number of constructions going on at the same time, absence of construction cost data, project planning, contract management, and extended periods between design and tendering. According to IE2, IE5, IE8, and IE12, these aspects intertwine intricately within the realm of budgetary planning as they encompass a spectrum of influences, ranging from external market dynamics to the internal intricacies of project management. Highlighting the importance of having proper government policies, IE10 pointed out that, government policies, rules, and regulations emerge as a central

driver, shaping budgetary contours by imposing constraints and opportunities. All Experts highlighted that poor financial control on-site, previous contract experiences and the impact of design changes collectively compound the Contractor's budget during economic crises. As highlighted by IE7, the proper execution of their duties is pivotal to safeguarding the budget, particularly in times of crisis, while any lapse in fulfilling these responsibilities can leave the budget exposed to risks.

Material, machinery, and transportation costs, contract duration, equipment maintenance, design alterations, raw material production, inflation, insurance costs, and currency fluctuations were identified as leading factors that impacted the contractor's budget during the economic crisis. Emphasizing the importance of adhering to the contract duration, IE9 pointed out that, as a project unfolds over time, the expenses often increase due to added overhead costs. Therefore, managing the contract duration becomes more challenging, and if the progress of the project does not align with the budget. Conversely, factors that do not exert a significant impact during crisis situations find unanimous agreement among Experts. The absence of influence from variables like the number of competitors, labour nationality, inadequate labour availability, shortage of site workers, and project size reaffirms their relative insignificance in budgetary considerations amidst economic crises. Furthermore, IE12 emphasized that the synthesis of these insights not only enhances the understanding of the underlying factors but also underscores the imperative for proactive strategic measures, flexible planning, and concerted collaboration. Further, these actions are essential to shield the Contractor's budget from the impact of economic crises.

4.3 Solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget (Round II Phase 02 and Round III Phase 01)

The findings from Round II Phase 02 and Round III Phase 01 are presented in this section. During Delphi round 2, interviewees were requested to propose solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget. These solutions were given by experts who have been actively involved in budget handling during the current economic crisis, making them highly relevant and practical for the current situation. During Round II Phase 01, experts proposed eighteen (18) solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget.

Then, during Round III Phase 01, six (06) solutions were omitted due to insufficient responses from experts, not meeting the 75% response cutoff. Finally, twelve (12) solutions were determined to reduce the impact of the Sri Lankan economic crisis on the contractor's budget, as illustrated in **Figure 2**. With that, the third research objective was achieved by identifying suitable solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget. The findings reveal a spectrum of potential solutions aimed at reducing the impact of the economic crisis on the contractor's budget within the Sri Lankan construction industry. These solutions reflect the collective insights and perspectives provided by experts, offering actionable strategies to address the multifaceted challenges posed by the economic crisis. All experts emphasize the importance of using concurrent cost data rather than using the previous cost data. IE12 pointed out that, using concurrent cost data can lead to more accurate and up-to-date insights for decision-making and budget management. Further highlighting the importance of using concurrent cost data, IE7, IE9, and IE12 emphasized that the concurrent cost data enhances transparency and accountability across the project lifecycle.

Most Experts stated that the solution of selectively bidding exclusively on financially stable projects rather than simply aiming to secure every bid can significantly enhance the contractor's budget. As stated by IE8, by targeting projects with established funding and financial stability, Contractors can reduce the risks associated with budget overruns, delayed payments, or sudden funding shortages. Exploring the possibility of

Clients supplying materials directly, as suggested by multiple Experts, presents a solution to reduce the impact of the Sri Lankan economic crisis on the contractor's budget. According to IE7, this solution can contribute to stabilizing material costs and enhancing budget control. As stated by IE3, "By adopting this approach, the potential benefits extend beyond the Contractor, as it aids in risk mitigation. From the Client's standpoint, this method eliminates the necessity of paying additional profits to the Contractor." Similarly, the encouragement of foreign investment was highlighted by most experts as a solution to reduce the impact of the economic crisis on the contractor's budget within the Sri Lankan construction industry. In there, IE10 pointed out that, policy initiatives need to aim at attracting foreign investors that can contribute to mitigating budgetary challenges.

Based on the interview findings, a framework for managing impacts on the contractor's budget due to the economic crisis in Sri Lanka was developed as illustrated in **Figure 2**.

5.0 DISCUSSION

The discussion section consists of four sub-sections; the effects of the economic crisis on the Sri Lankan construction industry, factors affecting the contractor's budget due to the economic crisis in Sri Lanka, suitable solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget.

5.1 Effects of the economic crisis on the Sri Lankan construction industry

The economic crisis negatively affects both developed and developing economies while the construction industry is easily affected by economic crises (Edmund et al., 2018). Through literature findings, twenty-seven (27) effects of the economic crisis on the construction industry were identified. During the Expert interviews, Experts finally accepted eleven (11) effects by amalgamating, modifying, and adding to previously identified effects. All experts accepted that loss of confidence in future market prospects was a significant effect of the economic crisis on the Sri Lankan construction industry. Ekanayake and Amirthalingam (2022) also emphasized that the decreased belief in positive future market conditions is making the impact on the Sri Lankan construction industry even worse, adding to the challenges it already faces and making it harder to recover. Supporting that, IE3 and IE7 emphasized that the effect of loss of confidence in future market prospects reverberates through different facets of the construction industry as it influences the initiation and continuation of projects, the allocation of resources, and the overall strategic outlook. Moreover, the findings revealed the exacerbation of financial distress through unbearable credit conditions during the economic crisis. Sriyani (2022) pointed out the economic crisis has ushered in a period of heightened uncertainty, prompting lenders and financial institutions to adopt a cautious approach toward extending credit to construction projects. IE2 and IE12 emphasized that establishing construction entities, faced with restrictive credit access, may encounter difficulties in securing the necessary funding for ongoing projects, expansion initiatives, or new ventures.

5.2 Factors affecting the contractor's budget due to the economic crisis in Sri Lanka

An array of critical factors significantly shapes and impacts the allocation and management of the Contractor's budget in construction projects (Yismalet & Alemu, 2018). Through literature findings and Delphi Round I findings, fifty (50) factors affecting the Contractor's budget were identified. Then during the expert interviews of Delphi Round II, experts finally accepted twenty-three (23) significant factors were identified as the factors affecting the contractor's budget due to the economic crisis in Sri Lanka. Examining factors relevant to contractor's budget in construction projects, a consensus emerged among all experts regarding the substantial impact of contract management. According to Berg (2020), proactive contract

management entails comprehensive scrutiny of contract terms, clear communication of expectations, and efficient monitoring of project progress. This is supported by IE7, stating that rigorous contract administration helps ensure that payments are made in accordance with project milestones and deliverables, thus maintaining a steady cash flow for the Contractor. As per the findings, among the most prominent factors that exert a substantial impact on a contractor's budget are the costs associated with materials, machinery, and transportation. As stated by Enshassi et al. (2009), escalating prices of construction materials, driven by market dynamics and supply chain disruptions, directly influence the feasibility and cost-effectiveness of projects. Similarly, IE12 pointed out that, the procurement, operation, and maintenance of machinery constitute substantial financial commitments that must be factored into budgetary planning. Furthermore, IE10 pointed out that, by examining these factors, Contractors can make informed decisions and implement targeted strategies to navigate the complexities of budget management, ultimately contributing to the advancement of the construction industry in Sri Lanka.

5.3 Solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget

The Sri Lankan economic crisis has given rise to a multitude of issues impacting both Clients and Contractors as it led to a significant slowdown and temporary shutdown of numerous construction projects across the country (Jayamal et al., 2023). Therefore, the challenges posed by an economic crisis necessitate a concerted effort to overcome them (Ioana et al., 2013). Through Expert interviews, eighteen (18) solutions to reduce the impact of the Sri Lankan economic crisis on the Contractor's budget were identified. Finally, experts accepted twelve (12) solutions by amalgamating, modifying, and adding to previously identified solutions. All experts emphasized the importance of clear contract terms and effective monitoring mechanisms. According to Pooworakulchai et al. (2017), implementing rigorous contract administration practices can help streamline payment processes, minimize delays, and enhance budgetary control. Supporting that, IE2 and IE5 emphasized that, the timely identification of delay events, immediate recognition of variations, and efficient handling of claims hold paramount significance within the realm of construction project management.

Similarly, most Experts highlighted that the utilization of concurrent cost data represents a proactive shift towards real-time monitoring and analysis in construction project management. According to IE10 unlike traditional reliance on historical cost data, which may not accurately reflect current market conditions or unforeseen developments, concurrent cost data provides a dynamic and accurate snapshot of project expenses as they unfold. Supporting that, Ji et al. (2019) emphasized, that this approach enables project stakeholders to promptly identify cost fluctuations, potential overruns, or unexpected expenditures, empowering them to make informed decisions in a timely manner. Further, all Experts emphasized that adopting a survival pricing mindset instead of aggressively aiming to win every bid ensures the budget allocated for a project is realistic and reflective of the actual costs involved. According to Awwad et al. (2015), this approach guards against underestimating expenses, which can lead to budgetary strain and compromised project quality. Further elaborating that, IE4 stated that, by adapting that approach, Contractors can prioritize a sustainable pricing strategy that accounts for all potential costs, safeguards profit margins, and maintains budgetary integrity. In summary, the findings from the conducted interviews were compared to the existing literature through pattern matching, leading to investigates of how to manage the impacts on the contractor's budget for construction projects due to the current economic crisis in Sri Lanka by addressing, effects of the economic crisis on the Sri Lankan construction industry, factors affecting the contractor's budget due to the economic crisis in Sri Lanka and solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget.

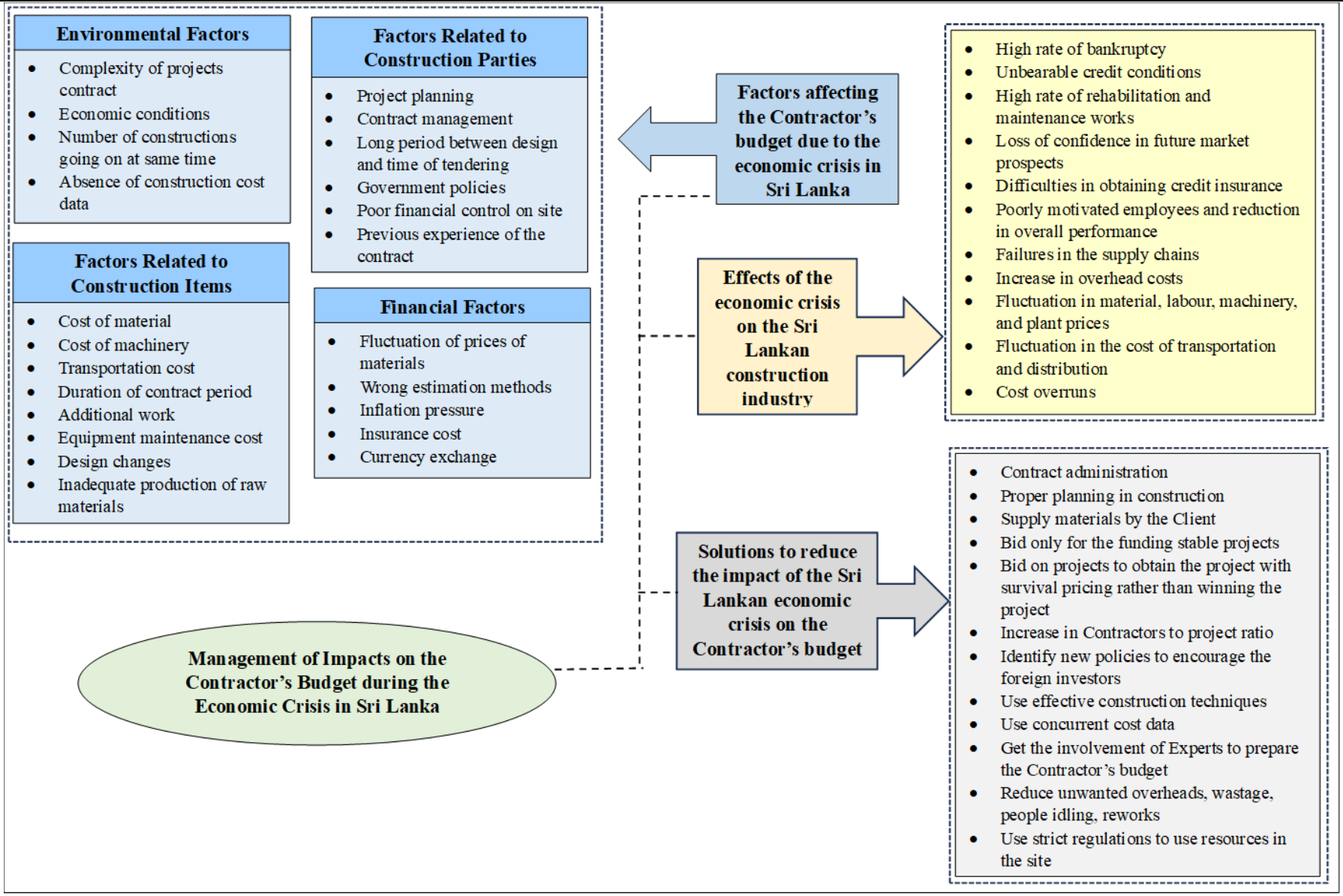

Figure 2. Framework to managing impacts on the contractor's budget due to the economic crisis in Sri Lanka

5.4 Framework for managing impacts on the contractor's budget due to the economic crisis in Sri Lanka

Based on the interview findings, a framework for managing impacts on the contractor's budget due to the economic crisis in Sri Lanka was developed (Refer **Figure 2**). This framework can be used as a guidance by the construction industry professionals to manage impacts on the contractor's budget. As this framework was developed specifically focusing on the Sri Lankan construction industry, this will provide a better pathway to manage the budgetary constraints in the construction industry.

6.0 CONCLUSIONS

In conclusion, this study investigates how to manage the impacts on the contractor's budget for construction projects due to the current economic crisis in Sri Lanka. Three qualitative Delphi rounds with the participation of fourteen (14) industry experts were conducted to achieve the aim of the study. Firstly twenty-seven (27) effects of the economic crisis on the construction industry were identified through literature and then experts finalized eleven (11) significant effects of the economic crisis on the Sri Lankan construction industry including failures in the supply chains that increase overhead costs, fluctuation in material, labour, machinery, and plant prices, and fluctuation in the cost of transportation and distribution. Secondly, fifty (50) factors affecting the contractor's budget due to the economic crisis were identified under the four (04) categories of environmental, construction parties-related, construction items-related, financial, and political factors. In there, at the end of the expert interviews of Delphi Round II, experts accepted twenty-three (23) significant factors were identified as the factors affecting the contractor's budget due to the economic crisis in Sri Lanka. Thirdly, experts suggested eighteen (18) solutions to reduce the impact of the Sri Lankan economic crisis on the contractor's budget including contract administration, proper planning in construction, supply of materials by the client, and bidding only for the funding stable projects. Finally, based on the findings a framework was developed for managing impacts on the contractor's budget due to the economic crisis in Sri Lanka.

This study no longer only enriches the knowledge of managing contractor's budgets during the economic crises in Sri Lanka but also serves as a basis for further exploration and strategic movement of managing budgets in the construction industry. By means of implementing the identified strategies and embarking on future research endeavours, the construction industry can efficiently navigate and mitigate the demanding situations posed by the economic crisis and emerge with enhanced budgetary resilience and operational performance of the construction industry.

7.0 CONTRIBUTION OF THE STUDY

7.1 Theoretical Contribution

The theoretical contribution of this research is particularly significant as there are no studies that have explored the intricate relationship between economic crises and contractor's budget management. As economic crises are complex and multifaceted events, there is a notable gap in the existing literature regarding their specific impact on contractor budgets. This study bridges that gap by shedding light on the factors influencing contractor budgets during economic crises and proposing effective mitigation strategies. Given the scarcity of comprehensive research in this domain, this paper can serve as a foundational benchmark study for researchers in this field. Its insights and findings can offer a starting point for understanding the challenges posed by

economic crises on contractor's budgets, providing valuable groundwork for further exploration and development of strategies to address these challenges effectively.

7.2 Practical Contribution

This research offers realistic contributions to stakeholders involved in construction projects within the context of the economic crisis in Sri Lanka. The findings provide treasured insights into the multifaceted factors affecting a contractor's budget, equipping practitioners with deeper information of the barriers and solutions to overcome those barriers. Moreover, the findings underscore the significance of effective contract management as a pivotal element influencing the stability of the contractor's budget. Further, an economic crisis can emerge unexpectedly, affecting the construction industry globally. The findings of this examination offer precious guidance that can be readily adopted by practitioners and decision-makers at the onset of an economic crisis, without having in-depth studies. The insights gained from this research provide proactive strategies for handling contractor's budgets during economic crises, permitting stakeholders to unexpectedly implement the identified effective solutions.

8.0 RECOMMENDATIONS

Even though this research study was limited to managing the impacts on the contractor's budget for construction projects due to the current economic crisis in the Sri Lankan context due to various restrictions, the wide scope of management of a contractor's budget during an economic crisis can be exposed to a broad spectrum. By considering that, it can be recommended for academic researchers to study further on managing the impacts on the contractor's budget due to the current economic crisis in different countries, as well as for different types of building and infrastructure projects. Further, as an economic crisis can occur expectedly at any time at any place, industry practitioners are encouraged to follow the framework developed as guidance for managing the impacts on the contractor's budget for construction projects due to the economic crisis, since it identifies the key aspects of contractor's budget management.

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