6-11-2025

Strategies for Reducing Cost Overruns on Government-Funded Infrastructure Projects in Jamaica

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This is to certify that the doctoral study by

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Walden University
2025

Abstract

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by

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MPA, University of the Commonwealth Caribbean, 2019

Research Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Cost overruns involving government-funded infrastructure projects have the potential to lead to adverse economic and social outcomes. Project managers and government administrators are concerned with cost overruns as they often lead to delays, resource misallocation, and decreased public trust. Grounded in the theory of constraints, the purpose of this qualitative pragmatic inquiry was to explore strategies project managers use to reduce cost overruns for government-funded infrastructure projects in Jamaica. Participants were five project managers working on large-scale infrastructure projects with experience effectively mitigating cost overruns in Jamaica. Data were collected through in-depth semistructured interviews, government documents, and public records. Five themes emerged from the thematic analysis: (a) comprehensive planning and risk management, (b) cost control and monitoring systems, (c) stakeholder management and communication, (d) political and administrative challenges, and (e) technology integration and innovation. A key recommendation is for project managers to implement upfront risk identification and regular cost tracking through modern project management tools. Project managers can use these identified strategies for effective planning, ongoing cost monitoring, stakeholder collaboration, political navigation, and technological integration to minimize cost overruns in government-funded infrastructure projects. The implications for positive social change include the potential for project leaders and government decision-makers to improve infrastructure investments' efficiency and sustainability, thereby enhancing public service delivery to local communities.

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Dedication

To my amazing wife, Melissa Whitely, my steadfast rock through the turbulent tides of this expedition. Your resolute support, patience, and partnership gave me the strength to persist. This doctoral degree represents my sole efforts and the unity of our vision for a brighter future together.

To my wonderful children, Lloyd, Onieka, O'Shae, Orion, and Oleisa, my shining beacons of hope, love, and pure joy. You are and will always be my greatest inspiration to leave an indelible positive impact on this world. May this milestone embolden you to fearlessly chase your grandest aspirations.

With this doctoral achievement, I would like to dedicate it to anyone who triumphed over life's challenges and who struggled yet pursued their dreams relentlessly and gracefully. May it light the fire inside of you to keep going and to never give up – to show you the way forward.

Acknowledgments

Completing this doctoral degree would not have been possible without the unwavering support and encouragement of many individuals. I sincerely thank my outstanding doctoral committee - Dr. Betsy Macht and Dr. Brenda Jack. Their invaluable guidance, insightful feedback, and unwavering commitment to academic excellence have been instrumental throughout this challenging yet rewarding process.

I am forever indebted to my incredible family. To my loving mother, Evadney Whitely, your unconditional love, belief in my abilities, and constant prayers propelled me forward, even in the most trying times. My heartfelt appreciation goes to my dear friends and colleagues who have been by my side through the highs and lows of this process. Your listening ears, thought-provoking conversations, and comedic relief rejuvenated me repeatedly. I am grateful for the camaraderie we share.

Finally, I acknowledge my relationship with God, the Divine source of wisdom, guidance, and perseverance. This milestone is a testament to the profound spiritual growth within me. I am blessed and deeply humbled by this experience. To everyone who has been part of this life-changing voyage, thank you from my heart.

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Section 1: Foundation of the Project

Background of the Problem

Cost overruns on infrastructure projects represent a persistent challenge for governments globally. In Jamaica, recurring budget excesses involving public works strain limited fiscal resources and hamper development goals (Guerrero & Castañeda, 2022). According to the World Bank (2022), an average of 50% over initial budget estimates is typical for Jamaican infrastructure initiatives. These overages undermine economic progress and service delivery across transportation, energy, water, and telecommunications sectors.

Well-planned public infrastructure provides vital economic foundations and societal benefits. However, cost escalations on significant capital projects diminish expected positive impacts while reducing funds for other priorities (Gil & Fu, 2022). Compounding infrastructure expenses can be especially detrimental for small and developing island states like Jamaica with already stretched finances. Ramifications include strapped government budgets which affect business competitiveness and quality of life for citizens (Richards, 2021). Developing strategies to curb overruns is crucial for successful infrastructure implementation. Some familiar drivers of runaway expenses for major public works include unrealistic cost estimations, changes in project scope, material price inflation, insufficient risk management, and contractor deficiencies (Tshidavhu & Khatleli, 2020). Public sector leaders require proactive and holistic frameworks integrating best practices for cost control throughout project lifecycles.

While academic literature abounds regarding overrun factors, an applied study focusing on the Jamaican government context is needed.

This study involved exploring proven cost management strategies that Jamaica's procurement specialists and project managers can implement to mitigate budgetary risks involving infrastructure contracts. Findings could lead to actionable guidance and process reforms for government agencies that are responsible for infrastructure delivery nationwide.

Business Problem Focus and Project Purpose

The specific business problem is some business managers lack strategies to complete government-funded infrastructure projects without cost overruns. Therefore, the purpose of this qualitative pragmatic inquiry was to explore strategies project managers use to reduce cost overruns for government-funded infrastructure projects in Jamaica.

The targeted population consisted of procurement or project managers of ministries, departments, or agencies (MDAs) in Jamaica who have implemented successful strategies for completing government-funded infrastructure projects without cost overruns. I used purposive sampling to select five participants and gain access to them through professional associations. To collect data, I used interviews with project managers and procurement managers who had success strategies, government documents, existing literature, databases, and public records and archival reviews. The conceptual framework for this study is Goldratt's theory of constraints (TOC).

Research Question

What strategies do business managers in public procurement employ to complete government-funded infrastructure projects without cost overruns?

Assumptions and Limitations

Assumptions

Assumptions are inferences or beliefs that are taken as fact without proof (Weisman et al., 2020). I assumed participants had direct experience managing public procurement for government-funded infrastructure projects from initiation through completion. Their roles and responsibilities involved strategic oversight of cost management practices and budgetary controls. Second, I assumed participants provided truthful and comprehensive responses during interviews. This was necessary to gather accurate qualitative insights. Third, I assumed participants had the authority and decision-making autonomy to implement cost control strategies across all phases of large infrastructure project lifecycles. Their strategic choices directly impacted final cost outcomes. Fourth, I assumed implementing effective strategies reduced cost overruns on government-funded infrastructure projects.

Limitations

Limitations of a study arise from practical or theoretical constraints that are often beyond the control of the researcher (Fetzer, 2022). A key limitation of this study is researching and analyzing complexities of infrastructure projects and cost overruns in Jamaica took time, and there were limitations in terms of duration of the study and availability of participants. A second limitation involved budgetary constraints.

Conducting a comprehensive study on strategies for reducing cost overruns required financial resources for conducting interviews, data collection, and analysis. A third limitation of this study involved stakeholder cooperation. Limited cooperation from government agencies, contractors, and other stakeholders who are involved in infrastructure projects hindered collection of relevant data and insights that were necessary for the study. Limited access to government project data was another limitation. Obtaining accurate and detailed data on past infrastructure projects and their cost overruns was challenging due to issues related to data availability, transparency, and government regulations.

Transition

I aimed to explore reduction strategies for cost overruns involving Jamaica's government-funded infrastructure projects. Section 1 contained brief information about the problem and a description of the business issue and purpose of the project. In Section 2, I discuss literature from academic and professional sources. Section 3 includes ethical issues, the purpose of this research, data collection, analysis, and reliability. In Section 4, findings and their implications for business practice, social change, and future research are addressed.

Section 2: The Literature Review

A Review of the Professional and Academic Literature

Literature Review Opening Narrative

Cost overruns in government-funded infrastructure projects remain a major issue that is rampant and complex, especially in Jamaica. This literature review involved discussing different methodologies that can be used for managing cost overruns with a focus on the TOC. I reviewed extant literature regarding prevalence of cost overruns factors in Jamaica, and measures to mitigate them. I aimed to identify ways of minimizing cost overruns involving infrastructural projects that the Jamaican government finances. This problem of cost increases was a significant issue in terms of public infrastructure delivery and could result in project schedule delays, scope reduction, and project cancellation (Steininger et al., 2020). All these problems not only exhaust public funds but also hamper the economic growth process and reduce confidence in government bodies.

In this study, I sought to explore and discuss strategies used by successful project managers involving Jamaican infrastructure projects to determine their cost-effectiveness. This research was particularly relevant due to Jamaica's ongoing infrastructural development and economic growth. Jamaica is a developing country that has a unique set of economic, political, and cultural realities. This study adds to existing knowledge on cost overrun management in settings that lack adequate resources. Results of this research are helpful not only for project managers and policymakers in Jamaica but also other

developing countries that face the same issues involving the process of infrastructural improvement.

Application to the Applied Business Problem

The TOC, developed by Goldratt in the 1980s, is a system thinking theory that is applied for management of high-cost infrastructural projects. According to Goldratt (1984), every system must at the very least have a constraint that temporizes operations involving end visions. Such constraints can be physical in terms of resource constraints and policies such as procurement policies or traditional project management. Scholars have used the TOC to address large and dynamic project environments such as infrastructure projects. Sarapinas and Sūdžius (2011) argued managing project scheduling leads to better certainty in terms of project accomplishments and costs. Parker et al. (2015) stated a better way to improve the TOC process is through integrating the TOC into traditional project management systems and tools. This also underlines the possibility of its applicability in terms of costly infrastructural projects with various difficulties. By recognizing constraints, project managers are able to achieve proper resource allocation and better timing and performance of the projects. According to Parker et al. (2015), the combination of the TOC with other traditional modes of project management is a way to develop more effective and less risky modes. This could assist in better understanding and implementation of risk management paradigms as well as handling of stakeholders during large infrastructural projects.

The TOC and its implications on risk management, resources, and stakeholders during large-scale projects is useful for practitioners and scholars in the domain of project management for developing good knowledge.

The TOC has been used for construction and infrastructure projects in order to enhance facets of project management. Mehmood et al. (2024) recommended the TOC with supply chain processes involving construction projects in order to eliminate time delay costs. Use of TOC concepts may greatly improve results of projects and compensate expenses of infrastructure initiatives. It means identifying constraints of projects and looking for improvements. This leads to better control over resources and their use as well as project processes and better overall control over costs.

I relied on search databases to make sure I accessed all kinds of information. I used the following search engines via the Walden University Library: EBSCOHost, Emerald Management Journal, SAGE Premier, ProQuest, and Google Scholar. I intended to increase the scope and depth of the literature review and address different dimensions of the problem using several types of research.

The literature search technique began with an initial search where no limit was set to determine broad information about the field of study. I then used an improved search for sources that were published between 2021 and 2025. Key search terms and phrases were *overhead expenses*, *project controlling*, *building construction*, *governmental projects*, *constructions*, *time extension*, *public domain*, *organizational management*, *supervision, Jamaica*, *developing nations*, and *TOC*. In order to reduce bias and ensure credibility of information, I focused on peer-reviewed articles. In order to determine

whether sources were peer-reviewed, Ulrich's Periodical Directory was consulted. Seminal papers involving the conceptual framework were used as well.

Potential Themes and Phenomena

Nature and Extent of Cost Overruns

The issue of cost overruns in infrastructure projects is a universal and complex problem, affecting developed, developing, and least-developed nations. V. Flyvbjerg et al. (2003) found nine of every 10 infrastructure development projects incurred cost overruns. The cost of any project tends to be about 28% higher than what is initially estimated, though there were noticeable differences in terms of different areas of infrastructure (Flyvbjerg et al., 2003).

Flyvbjerg et al. (2003) noted that rail projects had the highest level of cost overrun of 44.7%. Bridges and tunnels came closely behind with an average of 33.8% on average with the construction of road projects having the lowest average overruns of 20.4%. Such variations could therefore be attributed to the differences that each project type has in terms of their respective features. The development of rail infrastructure was slower with long-term planning and thus entailed high risks and uncertainty in cost appraisal. There are many difficult geotechnical and structural site conditions in bridge and tunnel projects that make it hard to predict cost overruns and risks. Surprisingly, road constructiveness plans were likely to incur slightly smaller overruns most likely because such projects were simpler, more standardized or because the industry had vast exposure to this particular field.

On this note, it was highly important to investigate these sector-specific patterns and levels of cost overruns in order to adjust more properly the planning and management strategies. The subsequent studies might have paid more attention to the contributors to the rail infrastructure overruns and formulate the maximum prevention strategies to improve cost estimation and other rail project characteristics for all types of infrastructure.

Cost overruns were not an issue in construction projects in a specific region but were a global concern (Steininger et al., 2020). This problem was evident in both developed and developing countries, which could be due to inherent problems in resource, cost, and time estimation and management in projects rather than a reflection of the country's economy or governance systems. However, if the focus was shifted towards developing countries, the problem was even worse here. The World Bank (2012) highlighted a particularly troubling aspect of cost overruns in these nations: the position of corruption. According to their findings, corruption alone could contribute 10-30% added value to one construction contract in developing countries (Martin et al., 2022). Corrupt practices therefore have a profound effect on the costs of projects and put forward the need for governance enhancement in project management practices (Locatelli et al., 2017). In addition, the phenomenon of excessive costs affected not only a specific project but might have had negative impacts on the development of these countries' economies and infrastructures. Therefore, reducing corruption in project management processes became not only the issue of financial management, but also the way in providing sustainable development for the countries.

This discovery was quite startling on several accounts. Firstly, there is the indicator that at least some of these extra costs might indeed have been caused by 'sand decisions' rather than, for instance, misestimation or unforeseen circumstances. Secondly, it elaborated on how international development projects faced issues of corruption, neopatrimonialism, and ineffective governance, particularly in aid-dependent countries (Harnois & Gagnon, 2023). This developed country might also face some governance and transparency factors that are exacerbating the cost overrun problem. This was why some measures, such as increased supervision of infrastructure projects funded by the government or enhanced reportage of such projects, had to be helpful due to the high risk of corruption leading to the high cost of projects.

Developing nations often experienced severe and unpredictable cost overruns in infrastructure projects, as evidenced by recent studies in countries like Ghana. Nuako et al. (2024) undertook a research in Ghana which noted high rates of cost overruns in construction projects. The study established that up to 90% of construction projects in Ghana were faced with cost control issues. These overruns ranged from a low of 5% of the original projected budget to a high of 200%.

According to Nuako et al. (2024) literature on costs control overruns, the percentage variation that is above 40% symbolized very high volatility and this signified high instabilities in project management and cost overruns in the construction industry. Such variation suggested that there could be systemic issues that hinder project implementation in developing nations. This comparison suggested that since Ghana recently lost its developing nation classification was presumably on course to experience

anthropological and infrastructural development issues like Jamaica which is in the process of developing infrastructure it may also experience issues like, for instance, cost overruns as pointed out by Geiger et al., (2019). Nuako et al. (2024) identified cost overruns as one critical issue, and thus the need to undertake proper project management and cost control measures in the developing countries. Some of the examples that included the current investment of Jamaica that was still underway in different infrastructure project and the future ones exemplified the learning from such kind of experiences and enhancing the systems that existed in order to reduce the probabilities of incurring substantially high cost overruns. Thus, it will be effective to outline the nature of cost variation in developing countries and find suitable recommendations for enhancing project management in such contexts in future research.

Spending too much in infrastructure investments could have had highly negative implications on the growth prospects of the developing nations and fiscal responsibility. There are consequences if project leaders over-expenditure a project for any reason there are implications to business. When projects are over budget by 200 % (Nuako et al., 2024), they could create many problems for public finance, and they also mean that one cannot fund other essential infrastructure projects. The fact that cost overruns were evident in 90% of the projects clearly showed that this is not an anomaly in a few sensitive projects but a general problem that had affected most infrastructure projects (Nuako et al., 2024). This prevalence indicated fundamental systemic problems in project development, management, and monitoring. These findings have important implications for Jamaica. As the country tried to create and enhance its infrastructure, it had to deal

with the reality that most of its projects will experience cost overruns. These overruns may be as small as five percent or as huge as two hundred percent, introducing a lot of risk in estimating costs in infrastructure projects. These uncertainties could reach systemic levels, influencing the government fiscal policy or the public perception of infrastructural projects.

The notion of corruption revealed by the World Bank (2012) report implied that Jamaica might require enhancing governance and transparency frameworks regarding technical project coordination efficiency. Mitigating corruption risks and enhancing supervisory mechanisms can result in significant savings in construction-related activities. Asiedu and Adaku (2019) argued that the types and levels of cost overruns in infrastructure projects offered a daunting task for every nation, especially developing nations like Jamaica. Flyvbjerg et al. (2021) showed this is a global phenomenon, although what Nuako et al. (2024) and the World Bank (2012) highlighted that developing countries are not immune to these effects. In the context of these global and regional trends, Jamaica must identify strategies that can help it reduce cost overruns in projects connected to government-funded infrastructure projects. It also faced additional challenges and risks that accompany corruption and governance situations typical for most developing countries, along with the inherent issues of project complexity and the difficulties in estimating costs.

Causes of Cost Overruns

Realizing the causes of cost overruns was a critical step toward solving this problem. According to (Durdyev, 2020) several factors pointed to the reason for this

challenge, and each factor is essential in explaining how different project costs ended up bloating beyond initial projections. Many were intertwined and cumulative, posed a problematic working context to project managers or stakeholders.

Inadequate planning and budget estimating capability were key factors that led to the conclusions about cost overruns. Abdel-Monem et al. (2022) pointed out that some causes of cost overruns include poor estimation. Nuako et al. (2024) pointed out that one of the many problems facing organizations was issues with accurate estimates. Again, having wrong initial estimates could damage the achievement of the overall idea, put projects on a path to cost inflation the moment they start. It was often due to insufficient data, unrealistic expectations, or failure to consider adverse factors or risks. Regarding government-financed infrastructure projects, the pressure to report lower initial costs to gain approval separately amplified this problem, created the phenomenon of cost-padding.

Another cause of cost overruns was economic factors, including, for instance, Jamaica, an economically developing country. The primary cause of the observed cost overruns was the timely tracking of cost and cost changes in the available construction resources (Abdel-Monem et al., 2022). These impacts could be devastating in nations characterized by an uncertain macroeconomic environment. Exchange rate movement might have affected imported raw materials and machinery through cost escalations due to exchange rate volatility. In contrast, local inflation may affect labor costs and other domestic resources. This is due to the long gestation period and the fact that infrastructural projects were susceptible to these economic changes since the initial cost

estimations might have taken much work to achieve during the whole life cycle of the projects.

Inadequate control of costs during the implementation of a project also led to excessively high costs which were beyond the projected figures. Other ways that Abdel-Monem et al. (2022) and Nuako et al. (2024) also mentioned includes; ineffective cost control measures. It meant that it was possible to have accurate cost forecasts prepared at the time of formulation of the project itself but the cost of a project may increase unless it was regulated. Lack of such matters might have caused carelessness in cost supervision, scheduling, and necessary rectification when small variances emerge to form big concerns of cost escalations. In government projects for instance other challenges like bureaucratic constraints and lack of proper authority to handle cost related issues might have actually compounded the cost control challenges.

Interference from the political system was one of the issues that were unique to politics or governmental sponsorship of infrastructural development. Catalão et al. (2020) also emphasize that cost overruns are associated with the electoral timeline, which demonstrated that political factors could have been the main determinant in the cost-setting process. This conclusion held excellent value, especially for the Jamaican context of assessing government-sponsored projects, given the politics involved could have skewed the findings. Such reasons made the planning and implementation of such projects depend on the wrong time frame set by politicians for electoral reasons. Also, political risks stemmed from changes in the political system in operation, in which

changes triggered changes or realignment of the project that might have resulted in cost and time overruns.

Other elements that had been blamed for project cost overruns were changes in scope during the execution of projects. Nuako et al. (2024) elaborated that work scope changes were a significant concern. These usually happened during the implementation of one project and might have resulted in significant cost hikes. They might have occurred due to the evolving inherent needs of the stakeholders, changes in the conditions on the site, or changes in the existing regulations. In government projects, the scope might have changed due to political pressures, a change of government, or a change in the government's priority areas. Changes were made, whether they are big or small, and created a rippling effect in terms of timelines, resources, and costs.

Corruption and strategic misrepresentation could be ranked among other more complex causes of cost overrun. A. A. Chadee et al. (2022) pointed out three significant causes of cost overruns: politically favored contractors and deliberate low bidding. However, this had shown how governance and transparency affected project cost management. Sometimes, such cost estimates may be inflated or undershot depending on the need to secure project approval; extra funding might have been sought later. They likewise chose contractors based on their political influence rather than their capacity to deliver services efficiently and with acceptable standards, resulting in increased costs.

Lack of sufficient risk control was a significant source of excess cost. According to Browning and Ramasesh (2022), effective risk management could significantly contribute to avoiding excess expenses. Lack of risk identification and management

might have resulted in some costs at the implementation stage of a project. Most infrastructural projects contained numerous and often related risks: technical, environmental, social, and regulatory. This is something that every project should have been aware of in order to avoid having a comprehensive risk management strategy.

These causes of cost overruns were not independent of one another but were interrelated and self-sustaining. For example, a lack of proper planning at the beginning meant that risk identification might have been poor, leading to scope creep issues. Similarly, political interferences may lead to corruption and strategic misrepresentation, while economic fluctuations complicate accurate cost estimations. Some of these may be exacerbated by a relatively weak institutional environment, scarce skilled human resources, especially project managers, and a poorly developed legal environment, as in Jamaica and other developing countries. These system-level issues, with the reality of complex large infrastructure projects, mean that cost overruns were almost inevitable without specific measures to address them.

Strategies for Reducing Cost Overruns

From the literature review and informed by the theory of constraints (TOC), the following strategies were identified. Improving the cost control problems of government-funded infrastructure projects. These strategies focused on handling aspects of project management and governance to adhere to the concept of the TOC, particularly the management of system constraints to enhance productivity.

Better Management for Planning and Cost Control

Practical project planning and projection helped create the proper budget and time projection. The TOC focuses on the system constraints and the so-called bottlenecks that, in this case, maybe the accuracy of the initial cost estimates. According to A. Chadee et al. (2023), Reference Class Forecasting (RCF) was one of the methods that might have been adopted to enhance the accuracy of cost estimations. RCF entailed utilizing information from similar projects and estimating costs, and it reduced the optimism bias inherent in traditional cost estimation.

In the context of this doctoral study, applying RCF could entail establishing a repository of all past government-impacting infrastructure projects in Jamaica. This type of database could be indexed by type, project size, project complexity, and other factors. Referencing such statistics enables project planners to understand previous performance levels, difficulties, and cost projections. This approach particularly suggested the TOC concept of stressing system efficiencies rather than local optimizations.

Better project planning could include more than cost appraisal enhancement. Risk management involved a comprehensive evaluation of the project needs, the expectations of key players, and the variability. Another advantage of increasing the time and effort devoted to the planning phase is that the possibility of unavailability of specific resources would be anticipated, and proper contingency measures would be provided. It can comprise activities such as conducting preliminary analyses to determine the project's viability, conducting the social, economic, and physical assessment of its impact on the project environment, and analyzing those affected by the project.

Cost Control and Monitoring Systems

Adequate control of cost was critical in minimizing the chances of costs going overboard over the approved budget at various stages of project implementation. Abdel-Monem et al. (2022) emphasized the significance of effectively controlling costs. Within the TOC framework, resources can be viewed as controlling the flow of financial, material, and human resources in the project system. Abdel-Monem et al. (2022) suggested that for Jamaican projects, this might involve actualizing real-time features such as cost control systems that constantly update the project cost. Furthermore, Abdel-Monem et al. (2022) suggested that cost control might be done regularly, as with cost audits, where discrepancies between actual and budgeted costs could be easily pointed out. The roles and responsibilities of cost control must be well understood and outlined within the project team, clearly identifying who is responsible for cost performance reporting.

The management of cost in infrastructure project requires the adoption of efficient project management tools and sound control mechanisms. According to Nuako et al. (2024) project and construction processes should be managed using improved project management software. According to Nuako et al. (2024) these tools should have had features for cost control solutions, material management and activity planning to enhance the coordination of the project. Nuako et al. (2024) also highlighted the recommendation of using earned value management systems in order to offer better details concerning the problems of costs, time, and results. Nuako et al. (2024) took their time to explain that a good change management system could not be underscored

Project management especially in infrastructure came with various issues and addressing them involves a diverse strategy to deal with Cost overruns are among the issues that project management faced (Nuako et al., 2024). New project management software that are enhanced could help in the monitoring and coordination of the projects in a real time basis and this will reduce on possible hitches that may lead to costs. Earned Value Management Systems gave a more extensive outlook for a project's performance so that potential problems can be detected and addressed at an early stage (Priyo, 2021). The focus on change management, therefore, highlighted the knowledge that if not managed effectively, scope creep led to cost overruns and it was important that the changes were managed well to maintain the aspect of budget. The implication of these recommendations could go a long way in enhancing cost control in infrastructure projects especially in developing countries where project costs are frequently experienced to have overrun. However, successfully adopting these tools and systems required technological investment, organizational commitment, and cultural change within the construction industry.

Change Management

Change management was a crucial but complex strategy for reducing cost overruns in government-funded infrastructure projects, with varying effectiveness across different contexts and implementation approaches. Lew et al. (2020) demonstrated that effective change management practices lead to better time, cost, and quality performance in Malaysian infrastructure projects. Wang et al. (2022) highlighted the negative impacts of design changes on New Zealand infrastructure projects and proposed strategies to

enhance change management effectiveness. Williams (2022) revealed that multiple change requests in post-conflict countries like Liberia can lead to substantial cost variances, increasing 307% to 400% in government-funded projects. These diverse findings hence re-emphasized on the issue of complexity of change management in infrastructure projects and supported the call on how one needed to apply unique approaches that would acknowledge the local contexts as well as we sense on how particular project contexts would be most appropriate (Harrison et al., 2021). Such contrasting results gave credence to the notion of contingency approach in change management especially in uncertain or emerging markets. These findings suggest that there is merit in change management for projects but that its application had to be done with regard to the type of project undertaking, the stakeholders involved or the ecosystem and the country to which the project belongs in order to achieve the optimum return to the containers in controlling for cost overruns.

While these studies agreed on the critical role of change management in controlling costs and improving project outcomes, they also highlighted the varying complexity across different contexts. The implementation of change management strategies depended on variables including project characteristics, political context, and legal requirements. However, Chester and Allenby (2022) and Lovallo et al. (2023) stated that because of the change management practices that characterize current complex infrastructural projects or the questions of strategic manipulation and optimistic bias, traditional change management strategies may require modification. Overcoming excess costs in infrastructural development projects funded by the government required a more

refined approach to change management. This approach should factored the actual and potential context of a project, involved stakeholder mapping and management, and communication plans and should be underpinned by systemic thinking and enhanced forecasting frameworks.

Contingency Planning and Risk Management

Socially generated infrastructure projects, especially those financed by the state budget, needed to have proper management of risks and reserves to avoid excessive spending. According to Browning and Ramasesh (2022), risk management could go a long way in preventing costs from soaring. This approach of handling variability and uncertainty was in line with the theory of constraints (TOC) method. In the context of the Jamaican setting, risk management during the planning phase was critical, which included technical, financial, environmental, social, and political risks.

Managing risks across the development and implementation lifecycle should have included the creation of elaborate risk registers, risk review processes, and risk contingencies. This was flexible, since new forms of risk appeared and conditions in the project evolved over time. Moreover, including threat and opportunities framework in the risk management process might have resulted in cost savings or better project results. Scenario planning and option generation built on the above steps and made a project more ready to handle different possible project paths. Public projects were also in a better position to deal with cost risks and overruns due to risk management and contingency planning for those projects. These approaches impacted budgeting in the sense that

recognizing, evaluating and managing risks during every phase of the project enhanced better estimations and overall project success.

Stakeholder Management and Communication

Stakeholder management and communication played an important role in the management of projects especially in Jamaican infrastructure projects. According to Fisher et al. (2020) lack of proper implementation of stakeholder and communication management might have caused conflict situations which resulted in cost overruns. This approach was in conformance with the TOC, which emphasized the interconnectivity of all the sub-systems in question, such as the stakeholders. Managing stakeholders required identification of stakeholders, understanding their needs and influence, and adopting the appropriate communication processes (Styk & Bogacz, 2022). This made sure all stakeholders including government ministries, contractors, communities, and end users were engaged time to time through meeting schedule, update and dissemination of information.

However, Khahro et al. (2023) opined that over-reliance on stakeholder engagement might have had negative consequences for decision making and project progression. Whereas Sheppard and Beck (2020) argued that insufficient stakeholder interaction might have led to reduced public support and political meddling. When managing conflicts, project teams needed to communicate frequently with stakeholders, thus getting timely feedback on the issues, selling the project, and increasing stakeholders' confidence. This approach was most important in the government-

sponsored programmes; the awareness of the general public could influence the success of the project, and lower the possibility of a project going over the budget.

Procurement and Contract Management

Measures related to procurement and selecting the contract management could play an essential role in reducing cost overruns of Jamaican infrastructure projects. A. A. Chadee et al. (2022) further noted contractor selection and contract design as two important independent variables that significantly affected the project cost overruns. This method corresponded to the TOC concept of identifying and managing constraining factors, known in English as the theory of constraints.

Contractor selection and contracting methods received a lot of importance with regard to cost escalation in infrastructure projects but their use could not be done without considering some factors. Ghodoosi et al. (2021) supported that contractor's assessment forms increased the level of accuracy and helped to avoid the emergence of cost overruns in construction projects. This signpost meant that the screening of contractors could go a long way in dictating the success of a project. However, the results of the projects achieved were not necessarily proportional to the criteria employed in the selection of personnel. Johnston et al. (2021) stated that if the selection criteria were set at a high level of specificity, then the level of competition might have been lowered, and the cost of delivering the bids would have increased, implying that the selection criteria needed to be reasonable and moderate. These differences applied in explaining the contractor selection and also in stressing the need to establish different procedures for different circumstances.

Performance-based contracting had been proposed as another approach to optimizing incentive structures between parties and increasing project effectiveness (Nikulina & Wynstra, 2022). This approach did not involve focus on input-based contracts but rather outcome-based contracts partly solving some of the issues with the contracting process. Nonetheless, the impact of performance based contract might have been occasioned by some factors such as level of project typology, market volatility or tendencies, and regulatory requirement.

In the Jamaican context, implementing clear and effective procedures for contractor selection was crucial. This process excluded unsuitable contractors and considered criteria beyond price, such as technical value, past performance, and financial capacity (Watt et al., 2009). Appropriate contracts could be established to reflect performance indicators and provisions discouraging extravagance, including key performance indicators (KPIs) for cost management. Performance-based contracting, which assigned specific risk and reward levels, was proposed to enhance efficiency.

A successful management of contracts entailed performance critiques and means for handling change of mind and conflict. Combining these practices from the project formulation allowed the execution of timely contractual solutions. Further, analyzing other forms of contracting that might have been applied to Jamaican projects, one might have assumed the existence of other mechanisms for managing the projects' cost and performance and incentives alignment of the project parties in order to enhance the chances of success in Jamaican infrastructure development.

Political and Administrative Challenges

Political and governance reforms were considered as instrumental in managing excess cost in deliveries of infrastructures for Jamaica. Overall, this present study confirmed the prior findings made by Catalão et al. (2020) and A. A. Chadee et al. (2022) that political causal factors remained major cost overruns' drivers calling for greater improvement in corporate governance. This finding supported the assertion made by Honig et al. (2022) who argued that large scale public projects called for transparency and accountability institutions. In order to eliminate such issues, the establishment of administrative offices that would independently oversee various activities and project, and quality of these projects could have been appropriate. Also, projects that included the provision of budgets and progress reports for projects could enhance the project's transparency and accountability for the project as noted by Bisogno and Cuadrado-Ballesteros (2021). Chang et al. (2021) also urged for the need to promote anti-corruption measures like improving the conflict of interest legislation's and the whistleblower programs. These political and governance factors might not have been directly within the control of the project managers; however, supportive advocacy for such reforms would have made the environment more favorable for achieving the goal of cost effective implementation in Jamaica.

Capacity Building and Knowledge Management

Efficient implementation of capacity building and knowledge management played a significant role in enhancing the state of project management within the Jamaican construction industry. Nuako et al. (2024), and Abdel-Monem et al. (2022) provided

sufficient evidence to support this correlation in line with the TOC and the culture of ongoing improvement. Tahir (2020) argued that effective training of the projects which focused on the construction industry included both technical and behavioral competencies. This finding implied the need for the development of a wide range of skills in managing a project. But when it came to academic qualifications, it was important to remember that the search for success in projects might have required more than just a certificate. According to Templeton et al. (2021), it was established that mentorship and coaching shared a similar importance to career growth. This perspective brought out the best at compromising and called for proper balance in career progression. Another area of intense focus in the recent past was the distinctions of knowledge transfer and cross-border cooperation. Although the general adoption of these practices among researchers remained relatively low, this statistical and systematic review by Hattori et al. (2022) found considerable evidence from more than 45 studies that their use was beneficial towards improving project performance. This finding implied that management of organizational culture, especially encouraging voice and international collaborations, could have played a critical role in delivering project successes in the construction industry

Several recommendations could have been put into practice within the Jamaican setting in relation to these findings. First, descriptive and prescriptive training models should have been established to include both technical and behavioral competencies. Another option might have been to establish certification standards for the major positions within the project. However, as indicated by Moradi et al. (2020), these should

have been supported by practice-based experience exchange activities. Another important step involved creating the necessary knowledge management tools. This might have entailed developing a list of model processes, organizing industry seminars, and adopting negative-incidence schemes. Engagement with other international organizations and countries presented avenues for the exchange of knowledge through efforts such as collaborative studies and intercultural training activities. This kind of documentation would have allowed for setting up a structured system for storing all the information concerning the project and for assessing the trends in delivery practices based on the results obtained. This approach aligned with TOC improvement focus and might have led to more accurate project planning and estimations. This research admitted that the application of these strategies in capacity-building and knowledge management would have been very useful in the skill development of the Jamaican construction industry in project management with improved cost management and other elements of project success. This approach addressed most of the major concerns mentioned in the research and formed the basis for further improvement according to TOC principles.

Technology Integration and Innovation

Various realization technologies like Building Information Modeling (BIM) in construction projects were discovered to be some of the best strategies for controlling cost overruns. This technological integration represented a new wave in project management whereby it shifted from the paperwork and individualism mode of working to innovative and integrated approaches that included the use of databases. Sami Ur Rehman et al. (2020) supported the notion that tech constraints enhanced project

performance and effectiveness. This view assumed that technology should not be viewed as an addition but as a part of development and that this changed the processes as well as the outcomes of the projects. The application of BIM and project management tools on projects for design and coordination purposes could be said to have enhanced their comprehension and minimized clashes at various stages of a project, leading to improved Life Costs (Deore & Joshi, 2024). For example, BIM fostered early identification of design clashes that resulted in costly change orders on construction sites due to the 3D modeling and detailed information that came with this product. They facilitated planning and scheduling, timely allocation of resources, monitoring, and control of projects, which made project control and efficiency more effective (Chen et al., 2023). What was more important was that all these technologies were real-time, and this was very important because it meant that one managed a project in such a way that costs were not allowed to overrun in the first place. Moreover, data analysis technologies enhanced data handling and analysis by contributing to better decisions and reduction of expenses (Nanda & Kumar, 2022). This data-driven approach represented a step towards fact-grounded project management, where there was more reliance on facts rather than feelings and a set of outdated reports. Nonetheless, it was pivotal to note that these technologies might or might not have worked effectively depending on the nature and scale of the project, the level of expertise of the team, as well as organizational culture. Future studies could have expanded on these findings to understand how these technologies' advantages varied by project type and size and in other countries with preconditions that hindered technological uptake.

While the initial investment in adopting new technologies might have been substantial, the long-term benefits of improved planning, project management, and cost savings were significant, especially in large-scale projects. However, successful technology adoption necessitated adequate training and change management practices to ensure effective utilization (Maali et al., 2020). Integrating artificial intelligence and machine learning technologies held promise in transforming cost estimation and risk management in construction projects (Baduge et al., 2022), positioning Jamaica at the forefront of project innovation. By embracing a holistic approach that combined innovative technologies with strategies informed by the theory of constraints, project managers and policymakers in Jamaica drove improved project outcomes and optimized the use of public resources in infrastructure development.

Gaps in Literature

Despite extensive research on cost overruns in infrastructure projects, significant gaps were discovered in the literature, particularly concerning developing countries like Jamaica. While numerous studies examined cost overruns in infrastructure projects, there was a need for comprehensive literature reviews that mapped out the causes and potential mitigation strategies for these overruns. Although many measures were suggested across the world to address the issue of cost overruns in infrastructure projects, little was known about their suitability and efficacy in certain regions, including Jamaica. Despite the effectiveness of these approaches in other countries, their effects on, and applicability to, the Jamaican construction environment had yet to be adequately researched, thus leaving a gap in the literature. This lack of context-specific research undermined the efforts of

Jamaican project managers and policymakers to select the most appropriate strategies. Moreover, the studies on the cumulative effectiveness of various mitigation strategies had to be advanced, as it was pointed out by Browning and Ramasesh (2022). This observation brought to light a crucial problem that characterized most research approaches, which investigated individual strategies in isolation without considering the combined impact of various strategies. An approach like this depersonalized the nature of infrastructure and the interaction drivers and may have resulted in less than the best solutions.

Adding another layer to the analysis, Catalão et al. (2020) noted that there was a lack of research focused on the long-term outcomes of governance reform in capacity-building projects and the efficiency of cost improvement in government-funded programs. This lack of longitudinal data was especially detrimental to countries such as Jamaica, where government-sponsored projects constituted a large part of infrastructure investment. The lack of documented evidence of long-term effects hindered the justification and continuation of more beneficial reforms in education. These research gaps suggested the need for consolidated, contextualized secondary studies that encompassed not only actors' behaviors but also their interactions and cumulative outcomes and costs. It was work that may have offered insights into how approaches to avoiding cost overruns could be best targeted in response to the specifics of the Jamaican context as found in construction.

These gaps in the literature presented several opportunities for future research. Empirical studies focusing on the Jamaican construction industry could have provided

valuable insights. Case studies and action research methodologies could have been employed to evaluate the practical outcomes of various cost overrun reduction strategies. Time-series analyses could have explored the long-term effects of governance reforms and capacity-building interventions, offering context-specific solutions for managing cost overruns. Besides, case studies and literature on exploring the applicability of new approaches such as artificial intelligence and machine learning techniques in project cost estimation and control could have led to the development of new novel solutions to this age-old challenge. Following research studies could then have helped in improving knowledge on cost overruns in Jamaica, given the following research gaps. This increased base of knowledge would have been valuable in the formulation of pragmatic guidelines to address overspending in infrastructural projects for the general improvement of Jamaica's construction sector and its overall economy.

Summary

Cost overruns in government-funded infrastructure projects in Jamaica were complex, and their eradication demanded an understanding of all these aspects for efficiency. According to TOC, this represented a perfect example of a complex issue that could be managed based on identifying and managing the constraints that were a part of the project system. Based on the review, the following strategies were established, hence the following potential interventions: inadequate planning and estimation, cost control, risk management, stakeholder management, procurement reforms and management, governance and accountability, organizational and institutional capacity, and technology

advancement. However, the impacts varied with careful calibration and localization to the Jamaican environment regarding economic, political, and cultural characteristics.

Possible avenues for future research included validating these strategies using surveys or case studies in the Jamaican construction industry and action research. Furthermore, understanding how these strategies intersected and how one or the other might have exerted a more significant effect on cost performance could have helped decide where to direct efforts. Overall, addressing cost overruns in infrastructure projects funded by the Jamaican government was likely a long-term process involving the concerted and coordinated efforts of various stakeholders from the government, project managers, contractors, and even oversight committees. By attempting to solve these constraints that caused cost overruns systematically, Jamaica could have improved the overall delivery of essential infrastructure projects and hence supported national development and enhancement of the quality of public services.

Transition

Section 2 included information from academic and professional journals involving the problem under study. In Section 3, ethical issues, data analysis, and credibility and reliability of findings are discussed. In Section 4, I address results, implication for existing business practices, potential social implications, and recommendation for future studies.

Section 3: Research Project Methodology

Project Ethics

Maintaining ethical principles was crucial for identifying successful methods involving managing costs of infrastructural development projects that were financed by Jamaican taxpayer money. Section 3 includes measures to maintain rights of participants and overall research standards. Since I was actively involved in research, responsibilities of data collection included direct participation in interviews with participants and completion of questionnaires, documentation, and financial records review. This enabled addressing factors that affected cost inflation for infrastructure projects. I addressed biases and potential ethical issues from the start of research. I was a procurement specialist for governmental infrastructure projects. This was important in terms of recognizing preconceptions that needed to be disclosed and addressed. I used a research journal which recorded my assumptions and decision-making processes as I engaged in the study. Participants were interviewed in order to ensure reflexivity during data analysis. These strategies helped with minimizing the impact of my biases during data collection and analysis, hence enhancing validity and reliability of research.

This study was grounded in principles that were outlined in the Belmont Report: respect for persons, beneficence and justice. In terms of respect for persons, subjects were recruited through informed consent forms. This required making participants fully understand intentions, processes, and risks associated with involvement in the study. Beneficence was ensured in that benefits of research outweighed costs in terms of risks for participants, and measures were taken to ensure potential harm was prevented. Justice

was achieved through fairly choosing participants. This meant the informed consent process was elaborate and comprehensive. Participants were informed about the objectives of the study, procedures, that and how collected data would be used and processed. Potential participants were given ample time to review information and ask questions before participating. Organizational research agreements were negotiated with relevant government agencies and business managers, outlining the scope of access to project data and terms of confidentiality.

Clear procedures for withdrawal were communicated. Participants could use email, phone calls, or text messaging to notify me of their decision to withdraw. In the event of a withdrawal, any data were immediately removed from the study and securely destroyed unless the participant explicitly consented to its continued use. Modest incentives in the form of gift cards were offered to participants to encourage participation without unduly influencing responses. Value of these incentives was carefully calibrated to acknowledge participants' time and expertise without leading to undue influence or coercion. This was aligned with ethical guidelines while potentially improving response rates and data quality. Ensuring ethical protection of participants was a core priority. All interviews were conducted in safe and private locations that were chosen by participants. Participants were reminded they may skip any questions they were uncomfortable answering, and they could pause or terminate their participation at any time.

Confidentiality and data protection measures were rigorous. All identifying information was removed from data and replaced with pseudonyms or codes. I used pseudonyms such as P1, P2, and P3 to refer to participants. Any potentially identifying

information involving project descriptions or financial data was avoided to prevent indirect identification of participants or organizations. All data will be stored securely for 5 years following completion of the study as per Walden University requirements. Encrypted digital data are stored on password-protected devices that are not connected to the Internet. Physical documents are kept in a secured safe that is only accessible by me. After 5 years, digital information will be deleted via software that was designed to delete data, and all physical papers will be shredded using confidentiality disposal services. This research proposal was taken to the Walden University Institutional Review Board (IRB) so clearance could be sought before data collection commenced. The doctoral project was summarized in a final document that contained IRB approval number 12-06-24-1192625 as well as evidence of having met and complied with all institutional ethical regulations. In this study, I made useful recommendations regarding how to successfully control government-funded infrastructure project costs with particular reference to ethical standards and procedures without compromising rights of participants as well as fairness and accuracy in research.

Nature of the Project

I used the qualitative research methodology. In this study, I identified and explored business managers' effective strategies regarding government-funded infrastructure projects without experiencing cost overruns. The research design for my study was a pragmatic inquiry. Pragmatic inquiry is applied to solve real-world issues, and findings were applicable in practice. After considering different design approaches, pragmatic inquiry was most appropriate for the study as I sought opportunities for

replicating successful strategies by examining existing similarities and differences between multiple projects.

Population, Sampling, and Participants

This study's targeted population comprised business managers who successfully implemented strategies to reduce cost overruns for government-funded infrastructure projects in Jamaica. All participants were individuals holding managerial or executive positions in infrastructure project management, directly involved in government-funded projects in Jamaica, and had experience with projects that effectively mitigated cost overruns. This ensured every participant was well-positioned to provide informative and pertinent data in order to respond to the research question. According to Yadav (2021), filtering participants based on criteria increases quality and relevance of data via qualitative research approaches.

In order to target participants, I used channels within Jamaica's construction and infrastructure development industry, as well as project and procurement managers responsible for project oversight. I tried to address professional organizations of which I was a member, as well as social networks such as LinkedIn. According to Rainer and Wohlin (2022), using professional contacts via networks of professionals is beneficial for addressing people working within narrow fields since participants trust such invitations, as senders are already on lists of contacts. In terms of establishing rapport with participants, I briefly described my aims and the Jamaican infrastructure industry. I then discussed the informed consent process with them and clarified any issues they had. I

presented the interview protocol to participants prior to interviews in order to familiarize them with the process.

The number of participants was five, whereby the participants were selected through purposive sampling to meet the eligibility criteria and to provide diverse information and opinions on how to tackle issues of cost overruns. Purposive sampling worked for this study since it allowed the choice of participants who could offer useful and relevant information (Campbell et al., 2020). The number of participants was justified on the basis of the need to explore deeper into the subject of discussion while at the same time compiling and analyzing a manageable data set. Sample size was still another factor that was of significant importance in the conduct of qualitative research studies for the purpose of attaining data saturation. As Mwita (2022) pointed out, when the sample comprised community and population some of which were comparatively similar, a sample size between five and 12 respondents sufficed in developing thematic saturation. For this, I endeavored to achieve the status of the sample size within this proportion. The problem of data saturation could therefore be avoided by continuing with interviews until data was analyzed at the same time. I also continued with the interviews until no new themes and valuable data were found and thus achieved data saturation (Naeem et al., 2024). This also assisted in making the study all-embracing in relation to the reliability of the results that were obtained.

Data Collection Activities

The method of data collection for this study was through interviews which were semistructured in nature and documentary analysis. The researcher was the main

instrument in the collection of data in this research study. Using this approach ensured uniformity and depth of data collection from all the subjects and therefore I chose a structured interview guide. This I could do from interviews hence allowing me to fine tune and come up with more ideas. Based on this guide, this study used an interview protocol. The semistructured interviews were conducted using a pre developed interview protocol (Adeoye-Olatunde & Olenik, 2021). This protocol consisted of questionnaires that corresponded to the set research objectives and objectives questions that enabled exploration of participants' experiences and perceptions towards cost overruns in government funded infrastructure projects. Further probe in the form of follow up questions could also be used depending on what emerged from the interviews and the ability of the researcher to respond appropriately (Roberts, 2020). To this end, I employed use of follow up questions where necessary to ensure that I fully understood participants' responses.

The interview protocol therefore acted as a framework in the entire process of the data collection. Each interview was preceded by examination of the protocol to refresh one's memory concerning the questions and their correlation with the goals of the study. In the process of the interviews, I strictly adhered to the protocol in order to be consistent in the questions asked and answer given but at the same time was flexible and prepared to follow new leads in case they cropped up. This method combined set questions with open discussion, giving detailed and varied information. (Kosztyán et al., 2023). A systematic approach to the participant interview ensured comprehensive data collection and aligned with best practices in qualitative research (Sanchez et al., 2024). My data collection

process involved the following steps: a) schedule interviews with identified participants, b) obtain informed consent from each participant, c) conduct semistructured interviews using the prepared protocol, either in-person or via video conferencing, d) audio record interviews with participant permission, e) take field notes during interviews to capture non-verbal cues and initial insights, f) transcribe recorded interviews verbatim, g) review archival documents related to government funded infrastructure projects, and h) code and analyze interview transcripts and document data.

I used multiple methods to ensure the data was accurate and trustworthy. These included member checking, where participants were asked to review a summary of their interview and provide feedback on the accuracy of my interpretation (de Loyola González-Salgado et al., 2022). I implemented this process to enhance the credibility of the findings. Triangulation was used by comparing interview data with archival documents to corroborate findings (Natow, 2020). According to Carcary (2021), researchers should document every procedure and decision made in qualitative research in order to enhance reliability and verifiability. According to this recommendation, I made sure to have a record of the entire study process documented.

Interview Questions

I used semistructured interviews for the data collection process. The interview questions included the following:

1. What are the most successful strategies have you implemented to prevent cost overruns in government-funded infrastructure projects?

2. How do you approach budget planning and cost estimation for large-scale infrastructure projects to minimize the risk of overruns?
3. What role does risk assessment play in your project management process, and how does it help in controlling costs?
4. What example can you share of a challenging infrastructure project where you successfully avoided cost overruns, and what specific methods did you use?
5. How do you manage relationships with contractors and suppliers to ensure they adhere to the agreed upon budgets and timelines?
6. What monitoring and control systems do you have in place to track project expenses and identify potential cost overruns early?
7. What are the most common causes of cost overruns in government-funded infrastructure projects, and how do you proactively address them?
8. How do you handle unexpected changes or scope creep during a project without allowing costs overruns?
9. What strategies do you employ to improve communication and coordination among various stakeholders to prevent misunderstandings that could lead to cost overruns?
10. What innovative technologies or management approaches have you adopted that have proven effective in controlling project costs?

Data Organization and Analysis Techniques

In my study focusing on strategies to mitigate cost overruns in government-funded infrastructure projects, I established robust systems to track data and insights

effectively. These systems encompassed securely labeled audio and text files, a dedicated researcher notebook, detailed research logs and tables, and a reflective journal. By organizing textual materials, audio recordings, diagrams, and tables meticulously, I aimed to facilitate the analysis and presentation of qualitative data in a structured manner, aligning with established qualitative research standards (Friedman et al., 2022; Lochmiller, 2021). This approach supported a thorough immersion in the data, iterative reflection, pattern identification, and interpretation, as advocated in the qualitative research domain (Braun & Clarke, 2022). I intended to employ thematic analysis as the primary data analysis method for the qualitative pragmatic inquiry. Thematic analysis is a basic type of qualitative analysis that involves a method of finding themes, meanings and insights regarding the given data through several coding procedures (Fuchs, 2023). Thus, I used thematic analysis to think conceptually and designedly while maintaining reflexivity in turn to meet the standards of qualitative research of ingenuity and reflection. This approach helped in developing a suitable framework for interpreting collected data this improved on the depth of the analysis.

In analyzing the data I made use of iterative analysis. Braun and Clarke (2006) pointed out that six-step method of thematic analysis is robust that provides a structure for conducting the thematic analysis to examine and interrogate several data sets systematically. The iterative process helps in analyzing the data and also reduces the chances of arriving at a predetermined result by forcing the research back to the narratives of the participants. The first of the steps was therefore in the explication of the data. These entailed translating the recordings into written format as a step of engaging

with the data. I listened to the recordings multiple times, thereby getting able to understand the major themes and strand of narratives that may reveal them. Secondly, I performed the creation of initial codes. To simplify the information's presentation, I employed a color-coded format so that the elements in the set applied represent one concept or idea separated from the other. I refined and adjusted the codes as I engaged with the material, ensuring they accurately reflected the content and context of the participant's responses.

Identification of themes was the most significant and important stage of the process in the context of thematic analysis. Thirdly, I looked for themes by placing the codes into possible themes that helped in identifying patterns on the dataset. In this phase, I sought patterns in the codes as well as how they were tied to other codes in the text. For this, the software named NVivo was employed as it provided easy management of codes and themes that were likely to develop during the analysis of texts. Fourthly, I reanalyzed the data to assess the credibility and dependability of the themes identified with regards to the participants' experiences and perceptions. I then questioned if it was still accurate when referring to the entire datasets and then made corrections. This was an important step in themes development as it helped to make sure that themes identified were valid and reasonable given the context of the data collected. The fifth step that was derived from Schreiber's research process after the revision of themes involved defining and naming the themes. This entailed a description of what these themes meant and, more importantly, how they fit the big picture of my study. The final step of the analytical process was the preparation of the report. In this last step, I integrated the themes

developed and the substantiating evidence of data analysis, completing the thematic analysis.

According to this systematic approach, I considered obtaining descriptive and explanatory conclusions from the data and providing a systematic analysis (Kotronoulas et al., 2023). Thus, whilst refining and developing an understanding of key themes within the research, reflexivity was used to relate the data to the broader literature and the conceptual framework of the study. Reflexivity helped in deciding on the final themes for analyzing the collected data by regarding the data, researcher implication, and theoretical approaches (Braun & Clarke, 2022). Future observations after writing the proposal assisted in constructing solid themes since participants had adequate time to reflect and be more reflexive. Furthermore, I ensured that all raw data collected was kept in a secure place for at least 5 years to avoid data loss or alteration in case of future verifications or analysis

Reliability

Reliability in qualitative research refers to the consistency and repeatability of the research findings (Kakar et al., 2023). It is the extent to which the results of a study can be reproduced if the research were conducted again under similar circumstances. Unlike quantitative research, where reliability is often measured statistically, qualitative reliability focused on the dependability of the data collection and analysis processes (Bingham, 2023). That dependability could be illustrated by providing the adequate documentation of research processes, using the specific and consistent approach to coding, and employing more than one coder when possible. The purpose was to ensure

sure that if other researchers assessed the same data and performed analysis, it would lead to similar conclusions hence establishing the credibility of the qualitative research study.

Dependability

In an effort to enhance the dependability of my study that employed qualitative research methods, I considered the following techniques in order to produce dependable data: My main approach was member validation of interpretations of collected data. To ensure that the analyses performed were correct and corresponded to the participants' experiences and opinions, I presented my first findings to the participants (Erdmann & Potthoff, 2023). Thirdly, all the research decisions, procedures, and thoughts related to the concerned study were documented systematically so that all the actions performed in the study had checks and balances, and if required, the same research process could be replicated, as suggested by Bingham in 2023. These methods were backed through feedback forms filled and completed by participants and through the analysis of the research journal completed during the duration of the research. Using these techniques ensured the dependability of my study to show that the results that had been established could be replicated.

Validity

In qualitative exploration, validity played a crucial part to assert the credibility of the results obtained in the research. Validity in qualitative research concerned the extent of truthfulness of scientific data (Adler, 2022; Braun & Clarke, 2022). It pertained to the validity of the research in that it measured what it had been designed to measure, and how accurate those results actually were. Validity in the context of qualitative studies was

defined as credibility which emphasized the extent to which the findings of the research were believable and plausible according to participants in the study (Lincoln et al., 1985). That reality was used in qualitative research was assertion that could be made and supported by other practices including extended involvement in the sample, consistent presence in the observation site, and data source confirmation. The purpose was to establish that the identified patterns relevant to the phenomena of interest in the given research were correctly represented and backed up by data

Credibility

Qualitative research also needed to address issues of credibility to increase the level of confidence on the results gained. As part of measure to ensure credibility in my qualitative study, the following strategies would be adopted. First, member checking would be employed whereby the original findings and conclusions would be presented to the participants for confirmation that the findings presented illuminated the intent and experience of the participants in the study (López-Zerón et al., 2021). Feedback and clarification would also be sought from participants with regards to summaries I would be giving them containing the interview transcripts and my analysis of the same. Moreover, methodological diversification would also be employed in the research which would entail the use of interviews, observations and documents (Dzwigol, 2022). Proof of the credibility measures would be attained from the participant feedback forms and while detailing on the methodology of triangulation in the study. Through such techniques, I would set high confidence level on the reality of the findings I conduct

Transferability

Transferability had been described as one of the strengths of qualitative research and as making it possible for the observation to be applied somewhere else. In the proposed qualitative study, the element of transferability would be highlighted by providing clear and adequate descriptions of the context in which the study was being conducted, participants involved and the findings with the aim of persuading others about the potential applicability of the findings to other contexts (Stalmeijer et al., 2024). This approach would enhance the chances of the research findings' usage in like manner in other similar settings that were out of the study's focus. This would entail the description of the particular setting, the characteristics of the participants, and the conditions under which the data was collected and analyzed. Also, I would clearly state the scope that this study would employ, with reference to any restriction and strengths that might be practiced on the findings (Linton, 2020). Signs of these attempts would be provided in detail in the methodology and the result sections of the research report I would produce. Thus, by providing this level of detail, I wanted the readers to have enough information base on which to determine whether the results were realistic and applicable to their workplaces or other similar studies.

Confirmability

The issues of confirmability which might arise in a qualitative study would be solved by following the strategies meant to ensure that the discovered results were more related to the participants responses rather than influenced by the researcher. An important feature would be the employment of reflexive journal throughout the research

process with detailing of assumptions, values, and possible biased that might affect the study (Holmes, 2020). Furthermore, an audit trail would be performed to provide proper documentation of research processes from the initiation of the project to study and findings' formulation and presentation (Dhollande et al., 2021). Documentation of these methods would be given through excerpts from the reflexive journal and description of decision making process in the method section. Through the use of these techniques, I also convinced anybody who was interested of the neutrality of my findings as well as showing people the progress of the research process.

Data Saturation

In my qualitative study, I utilized systematic process of data collection and data analysis techniques that resulted in data saturation. I kept on carrying out interviews and collating data until the point where there was a repetition of themes, hence, reaching theoretical saturation (Naeem et al., 2024). In the process of this research, I employed the constant comparative method where data collected was compared with previous data collected on a continuous basis in order to discover emerging trends (Spearing et al., 2022). That was done by giving a detailed account of the different coding phases and the point during the study where no new code or theme was developed. I also demonstrated succinctly how the sample was estimated and justified in relation to the various objectives of the research and the research strategy used. Through the approaches listed above, I explained to the readers that I have effectively captured all aspects of the research questions and the study findings.

Transition and Summary

The objective of this research was to explore ways to prevent cost overruns for Jamaican infrastructural projects. In the study, the problem was stated along with my objectives and ethical issues. I addressed assumptions and limitations using the TOC as the theoretical framework. I emphasized the importance of the study and review of professional and academic literature. Section 4 includes analysis of findings and applications to business practice, social development, and research, followed by a conclusion.

Section 4: Findings and Conclusions

The purpose of this qualitative pragmatic inquiry was to explore strategies project managers use to reduce cost overruns for government-funded infrastructure projects in Jamaica. Thematic analysis led to five major themes: comprehensive planning and risk management, cost control systems, stakeholder communication, addressing political and administrative challenges, and technology integration. Goldratt's TOC was used to explain how participants managed to reduce cost overruns for government-funded infrastructure projects in the Jamaican public sector.

Presentation of the Findings

The research question for this study was: What strategies do business managers in public procurement employ to complete government funded infrastructure projects without cost overruns? Data sources were primarily interviews with five project managers who had extensive experience overseeing government-funded infrastructure projects in Jamaica. While I initially aimed to incorporate comprehensive document analysis from government archives, existing academic literature, infrastructure databases, and public records, access to these secondary data sources was significantly limited within the Jamaican context. Lack of digitalization and systematic documentation of infrastructure projects in Jamaica meant traditional archival reviews yielded minimal usable data.

Despite these limitations, rich insights from in-depth interviews with experienced project managers were valuable in terms of perspectives regarding this topic. To ensure

confidentiality, participants were assigned distinct pseudonyms, the data during interviews were entered into Microsoft Word and labeled accordingly (see Table 1).

Table 1

Demographics of Participants

Pseudonym for participants	Gender	Years in position	Position/Title
P1	Male	25	Project Manager/Quantity Surveyor
P2	Male	10	Principal Engineer/Managing Director
P3	Male	27	Civil Engineer/Project Manager
P4	Male	6	Civil Engineer/Project Manager
P5	Female	5	Civil Engineer/Project Manager

The member-checking process was conducted by sending each participant a specific email. All five participants responded to emails favorably. After reviewing interview recordings and transcripts, I determined data saturation. Data saturation occurs when no new information or themes emerge from the data collection process (Braun and Clarke, 2022). This process means additional interviews or data would likely yield redundant insights, indicating sufficient data were gathered to fully understand the research topic. Therefore, the study reached a point where further data collection was unnecessary, ensuring reliability and completeness of findings.

Microsoft Excel was used to analyze data. In order to create categories from codes, a codebook was created. I derived themes from codes and categories supported by interview data through reflexive thematic analysis (see Table 2).

Table 2

Theme Table With Supporting Codes

Themes	Theme 1: Comprehensive Planning and Risk Management	Theme 2: Cost Control and Monitoring Systems	Theme 3: Stakeholder Management and Communication	Theme 4: Political and Administrative Challenges	Theme 5: Technology Integration and Innovation
Category	Initial Assessment, Risk Register Maintenance, Front-End Planning	Cost Tracking, Performance Metrics, Budget Reviews	Regular Meetings, Stakeholder Engagement, Communication Platforms	Scope Creep, Political Interference, Bureaucratic Constraints, Budget Timing Issues	Software Utilization, AI Implementation, BIM Integration
Codes	Initial assessment, Risk register maintenance, Underground services planning, Value engineering	Material price monitoring, Weekly cost tracking, Contingency planning, Cost per kilometer estimation	Multi-stakeholder coordination, Communication platforms, Transparent communication, Regular meetings	Scope creep, Political interference, Bureaucratic constraints, Budget timing issues	Project management software, Cost tracking tools, Communication platforms, AI, Traditional methods
Supporting Quotes	“What we have done in that regard is to look at serious planning in the initial stages... to ensure that those things are implemented from the onset.”	“What we do is that we use Project management software... able to show us items on a critical path, not just the critical path along but also show cost.”	“We tend to have technical meeting as well as site meetings as well as we sometimes we use some integrated software like Pro Core that communicates changes to every person on the project.”	“Critical thing for cost overruns in government project is the government themselves... They will start out with X because of political interference or want to score political mileage.”	“We try to use software as much as we can. Use both Microsoft products and we use AI...to help guide us or to determine where at a particular point in time the project should be in terms of tracking it.”

	"We also look at establishing some structures so that we are clear with how our budget is. Meaning a contractor can't go ahead and execute something without he gets approval."	"For infrastructure projects it is... for an initial budget from experience, you probably look at the cost per kilometer for Rd. based on your experience."	"The first is the people you need to talk to are the people who live in the community..."	"Sometimes in order to... spin allotted money, they may say let's do something because we need to spend this money before the financial year runs out."	"Our total platform is being based on Building Information Modeling that integrates Architectural, Mechanical, Electrical, Plumbing, and Fire design."
Category	Risk Assessment, Contingency Allocation	Cost Forecasting, Budget Monitoring	Stakeholder Engagement, Regular Meetings	Political Timing, Socioeconomic Factors, Administrative Delays	Digital Documentation, Virtual Meetings
Codes	Risk identification, Feasibility studies, Cost-benefit analysis	Budget tracking, Performance review metrics, Financial reviews, Cost forecasting	Stakeholder engagement, Feedback mechanisms, Open communication, Regular site meetings	External factors, Political pressures, Administrative inefficiencies	Digital tools, Virtual meetings, Software utilization
Supporting Quotes	"We do a lot of front-end planning before we get to the construction phase. So at inception and conceptualization, we do a lot of risk identification..."	"The software usually shows this up and you take action accordingly. And one needs to look at the fact that prices do not always go up. There are sometimes that prices go down."	"The project management plans that are drafted... require integrated communication management plans."	"So that takes into consideration whether whatever socioeconomic factors they are proximity to election in terms of time."	"We use computer software... we try to keep virtual meetings because we know that each can meet online."

	"We develop our research...we then have our risk matrix where we will basically score or rank different risks..."	"We ask our contractors to supply us with a Gantt chart...we will use Microsoft projects both to track the time constraints of the project..."	"We're honesty and contractual commitments... all agreements are documented and everybody signed and witnessed by a third party."	"If you are going to operate within an area or a country that has issues with violence and extortion and any other disruptions..."	"We use Arcad software... we try to keep virtual meetings because each can meet online."

Theme 1: Comprehensive Planning and Risk Management

When it comes to containing cost overruns of government funded infrastructure projects, planning of project and risk management was one idea that dominated the discourse of all participants. First, it is important to emphasize that all the interviewed experts agreed that proper preliminary planning and constant risk analysis are crucial to prevent cost increases throughout the project. Some of the participants expressed the need to conduct proper needs assessments and risk analysis before developing a plan. According to P1, "What we have done in that regard is to look at serious planning in the initial stages... assess the needs of what the government wants and ensure those things are implemented from the onset." This approach of identifying risks at a preliminary stage helps the project managers in the formulation of strategies for overcoming any barriers that might be experienced. (P5 elaborated on this approach by stating, "At inception and conceptualization, we do a lot of risk identification, where we basically look at both the feasibility of the project as well as any potential risks associated with the project." Through risk evaluation and differentiation with the help of risk matrix, the managers can allocate resources more effectively and design contingency plans.

Detailed planning during the project scoping phase was highlighted as crucial to avoid mis-estimations and scope creep. P4 mentioned the importance of “having detailed plans and spending the time to adequately look through the project to ensure that all aspects of the project are properly accounted for.” Similarly, P2 stressed, “We did our project plan over roughly a three-month period... bringing together all our key experts,” underscoring the need for collaboration and thorough preparation. When project managers ensure that all the variables are captured from the onset of the project, then project goals and time frames are clearly defined and they do not have to budget for unpredicted costs (Ahmed & Jawad, 2022).

Participants also consistently indicated that implementing contingency planning and risk mitigation strategies was an important consideration in project management. P3 emphasized, “First issue is always... Plan always includes some form of contingencies... you have to once again examine what has happened at that very time of year in that same locale for previous projects.” Contingency accounts, which are normally between 5 and 15% of the total project costs, were employed to conceal costs due to the various risks such as material cost change or even unfavorable weather conditions (Love et al., 2024). P2 further highlighted, “We had in our project plan accounted for 25% contingency as opposed to a 15%... which we would use.” This means that the risk management is usually managed proactively and involves providing for larger contingencies in the project plan to cater for any probabilities that arise.

Another area of the comprehensive planning mentioned by participants was feasibility studies. P5 noted, “We develop our research... we then have our risk matrix

where we will basically score or rank different risks associated with the project to then find to then home in on the risk that are more likely and develop mitigation strategies and contingency plans." This means that all the important risks are not only detected but also prioritized, which helps plan and approach the whole procedure systematically. Moreover, participants emphasized on the importance of constant monitoring and reassessment during the implementation of a project. This dynamic nature of the infrastructure projects implies that risk can change, and therefore, the management plans have to be responsive.

Comprehensive planning and risk management aligns closely with the TOC, which emphasizes the identification and management of the limiting factors that hinder a system's performance. From the findings of the study, the initial risk assessment and planning practices can be described as a process that allows to early identify possible factors that may hinder a project, like a limited budget, a shortage of resources or other factors (for instance political influence). The TOC suggests that once the primary constraints are identified and managed, the system's overall efficiency and performance can be optimized, similar to how comprehensive planning helps mitigate risks and ensures smoother project execution (Parker et al., 2015). As such, the planning procedure and risk management in accordance with the TOC leads to the efficient usage of resources, reduces the amount of time consumed and assists in the successful achievement of the project objectives and meeting the budget and time constraints.

Comprehensive planning and risk management aligns perfectly with the TOC. As established by Goldratt (1984), TOC recognized that every system has constraints that limit its performance, whether physical resource limitations or policy restrictions. The participants' emphasis on preliminary planning and risk assessment demonstrated a practical application of TOC principles, as they work to identify potential constraints before they impact project execution. This approach resonates with Parker et al. (2015) recommendation to integrate TOC with traditional project management systems to enhance effectiveness. When participants like P5 develop risk matrices to "score or rank different risks," they are essentially implementing TOC's focus on constraint identification and prioritization. Sarapinas and Sūdžius (2011) supported this approach, noting that identifying and managing critical chains in project scheduling leads to better certainty in project accomplishment and cost control. Furthermore, Mehmood et al. (2024) and Gade (2016) have demonstrated TOC's effectiveness in construction contexts, particularly in eliminating time delays and improving labor productivity—both critical factors in containing infrastructure project costs.

Comprehensive planning and risk management emphasis is strongly supported by contemporary literature on infrastructure project management. Browning and Ramasesh (2022) confirmed that effective risk management is essential for preventing cost escalations in government-funded projects, which directly validated the participants' focus on this area. The participants' descriptions of developing detailed risk registers, scoring systems, and contingency planning align with the literature's prescription for

managing "technical, financial, environmental, social, and political risks" throughout project lifecycles. When P2 mentioned allocating a "25% contingency as opposed to a 15%" typically used, they demonstrated the practical implementation of the literature's recommendation for flexible risk contingencies that adapt to evolving project conditions. This approach reflects what Love et al. (2024) described as proactive risk management, where contingency accounts for 5-15% of total project costs are used to mitigate risks like material cost changes or unfavorable weather conditions. The participants' discussions of feasibility studies and ongoing monitoring also align with the literature's emphasis on scenario planning and option generation, which prepare projects to handle different possible trajectories, ultimately enhancing budget estimations and project success.

Theme 2: Cost Control and Monitoring Systems

Another factor that contributed towards the increase in cost of the government funded infrastructure projects was the absence of the proper cost control and monitoring systems operating within the industry. The results revealed that all participants agree on the measures that require effective cost control practices and constant monitoring of costs to ensure the prevention of costly expenses throughout the life cycle of the project. The findings from the interviews reveal that effective management of the financials through tracking, the application of effective project management tools as well as timely actions go a long way in keeping the infrastructure projects within the required budget.

Participants expressed consensus on having set a baseline budget at planning stage and subsequently monitoring and adaptations being made as and when necessary.

Participant 4 (P4) explained the importance of this process: "...by doing multi-stage cost reviews... at each milestone, we would check the cost and review the cost to ensure that there is not any cost overrun." Cost control, done on a periodic basis and normally linked with project phases, allows the project manager to compare standard costs and recognized costs and detect the disparities. This approach allows for early intervention when such minor anomalies appear hence preventing the instance where the problems become large financial issues that come at a later stage in the project.

Some of the participants pointed out that they rely on setting performance indicators, and monitoring systems to ensure that projects remain on track. In the account of the final participant, P5 explained, "We have performance review metrics... to track the time constraints of the project as well as... track resource allocation." These systems assist in tracking finances and expense while at the same time determining the progress of a project thus offering a complete outlook of the project's progress level. P1 also discussed about the use of software in the management of costs: "What we do is that we use Project management software... able to show us items on a critical path, not just the critical path along but also show cost." Addressing financial tracking within the management of a project means that costs are being tracked simultaneously and are easily modifiable when a change in task scope or resources occurs.

Further, a significant focus of cost control was on material price monitoring and cost forecasting. Participant 3 (P3) explained, "One great thing to do is if you can buy everything at the beginning of the project when the price is... what you had quoted on, it is the best option for you." Bulk purchasing and supply of materials in advance at the

beginning of the project helps in managing the cost of construction effectively and also minimizes all risks related to change in prices during the construction (Ajmal et al., 2022). Also, maintaining the overall cost control as well as subsequent costs were deemed vital in the decision-making process by being able to predict future cost outcomes well in advance. In P5 , the respondent pointed out that, “We ask our contractors to supply us with a Gantt chart... we will use Microsoft projects both to track the time constraints of the project as well as track resource allocation.” These tools assist project managers to foresee prospective costs, by which mishaps can be avoided when they are out of the project budget.

Another discovery was that most practices have adopted the use of today’s advanced cost tracking systems and other software applications. Specifically, participant 2 (P2) pointed, “We use software... to track the time constraints of the project as well as resource allocation,” highlighting the growing reliance on digital tools for cost management. There are tools like Building Information Modeling (BIM) and other application software that enable one to monitor the expenses and resources in real-time hence giving a conceptualized picture of the financial position of the project (Ajmal et al., 2022). This immediate access to data means that the project managers can quickly make sound decisions and opt for alteration of budgets as well as adopt cost-cutting measures without much delay.

Contingency planning was another element that was incorporated in the cost control framework. Everyone stressed on the aspect of contingency funds and their ability of having to adjust with the budgets as the projects continue. Participant 4 remarks,

“Some level of contingency planning is required... because a contingency is for any unforeseen event, we will not see everything that happens.” By setting aside money for a contingency budget and making it easily available in case of any appearance, major budget alterations within the project plan can be prevented.

Cost control and monitoring systems are consistent with the TOC because it emphasizes the need to identify and address financial constraints in real-time. According to TOC, managing the limiting factor within a system; whether it be time, resources, or cost ensures the project's overall success (Gade, 2016). The study’s findings highlight the importance of continuous cost tracking, performance metrics, and budget reviews, which serve to monitor and control these financial constraints as they arise. Regularly identifying and addressing deviations from the budget enables project managers to minimize the impact of financial bottlenecks thus improving overall project performance and preventing cost overruns. This approach mirrors the TOC’s focus on optimizing performance by managing constraints efficiently (Goldratt, 1984).

Cost control and monitoring systems was strongly supported by the contemporary literature on infrastructure project management and cost overrun prevention. Abdel-Monem et al. (2022) emphasized the critical importance of effective cost control mechanisms within the Theory of Constraints (TOC) framework, viewing resources as controlling the flow of financial, material, and human assets in the project system. This directly aligned with the participants' emphasis on establishing baseline budgets and conducting regular cost reviews, as noted by P4 practice of "multi-stage cost reviews." The literature further validated the participants' reliance on digital tools, with Nuako et al.

(2024) advocating for improved project management software with features for cost control, material management, and activity planning—precisely the approach described by P2 and P5 who utilized software to "track the time constraints of the project as well as resource allocation." Priyo (2021) reinforced this by highlighting how Earned Value Management Systems provided a comprehensive view of project performance, enabling early detection and resolution of potential issues, which corresponded to the monitoring systems described by the participants. Ajmal et al. (2022) specifically validated P3 strategy of bulk purchasing materials at the beginning of the project, confirming that this approach effectively managed construction costs and minimized risks related to price fluctuations. The literature also supported the implementation of Building Information Modeling (BIM) for real-time expense monitoring, providing project managers with immediate data access for prompt decision-making—a practice that the participants described incorporating into their management approaches.

Theme 3: Stakeholder Management and Communication

Stakeholder management and in particular, communication, represent a core competency when undertaking any government funded infrastructure project. This came out as one of the strategies participants mentioned in their discussion with a view of avoiding cost overruns. Coordinating the stakeholders, their expectations concerning the project, as well as involvement helps to keep the project afloat and cost-effective. The interviewees stated that having a clear communication, daily or weekly meetings, and the use of collaborative tools are critical in order not to have misunderstandings that can

hinder the progress of the project and can lead to costs that were not initially planned (Ajmal et al., 2022).

A consistent finding across the participants was the importance of holding regular meetings with stakeholders at every stage of the project. Participant 4 (P4) emphasized the importance of "regular multi-stakeholder meetings outside of the site meeting...you would need to include all stakeholders so that would include the technical team, as well as the persons that would utilize the space." This approach makes sure that everyone interested in the project's progress and any changes or difficulties within the project is aware of them. It also makes it possible to identify problems that may arise, for example, in terms of scope, schedule or resources and analyze them before they cause an overspending. On the same note, it also helps in creating a collaborative environment where everyone concerned can raise their issues and provide their inputs when approaching the next step taken during a meeting will not have a negative repercussion towards the scope and cost of the project (Ajmal et al., 2022).

It was established that mutual communication should remain open in order to avoid misconceptions and ensure that all parties have the right expectations from the project. Participant 3 (P3) shared, "We kept open lines of communication with the contractor... we kept regular site meetings, keep abreast with the happenings of the project, so met with the contractors regularly." This ongoing communication ensures that the project team remains aware of any potential risks or issues that may arise and provides them with an easy solution in case anything occurs, preventing it from escalating and affecting the operations. As Participant 2 (P2) explained, "We implement

regular multi-step solutions meetings... and by doing that, even if you are behind, you can understand where the project is, so you know what is required to get up to speed." Stakeholder management also requires the management of stakeholder expectations. These interviews showed that setting expectations in terms of what is expected of both sides at the beginning of the venture is an effective means of avoiding pre-negotiation of things such as cost that lead to scope creep elements. Participant 4 (P4) noted, "By having clear conversation from the start and clear communication from the start about what is required and what is expected, we can manage stakeholder expectations." This significantly reduces the chances of being presented with controversies or outrageous demands that may cause changes or delays. Informing the stakeholders of what is not feasible and assists in managing customer expectations in order to avoid more changes, which in turn raises costs.

The participants also shone more light on the importance of engaging formal stakeholders such as contractors and government agencies as well as the community. Participant 1 (P1) shared, "The first people you need to talk to are the people who live in the community... because sometimes you're going there to put in a 600 MMM culvert... what the people can tell you that when the water comes down this side." This means that when a project initiates its early stages of development, there will be the opportunity to understand some of the local community issues that are of concern and may affect the delivery of the project in terms of environmental consideration or infrastructure (Ajmal et al., 2020). This helps in timely identification of issues and prevents possible expensive fixes later into the project, thus benefitting the project management process.

Lastly, the facilitation of the cross-hierarchical and cross-functional coordination also emerged as a form of strategy in enhancing communication among the stakeholders. Participant 1 (P1) mentioned, “We tend to have technical meetings as well as site meetings... sometimes we use some integrated software like Pro Core that communicates changes to every person on the project.” Through the help of software such as Pro Core, everyone is in the loop thus increasing the probability of misunderstanding and miscommunication which may cause delay and costs. This paper seeks to establish the significance of technology in relation to communications with reference to big and complicated situations that involve many players.

This theme could be linked to the TOC through the general notion of interpersonal and organizational constraints that may exist in the process of project implementation. TOC focuses on the need to recognize and eliminate the constraints to the improvement of a system, and with regard to infrastructural development projects, one such barrier may be lack of proper communication with or coordination among pertinent actors. In this case, stakeholder management involves setting meetings, reporting, and sharing important information with different stakeholders, such as governmental institutions, contractors, and the local communities, so that they would share the vision of the project and its goals (Goldratt, 1984). If key communication challenges are detected early, they can in fact create problems that would have slowed project progress later on. The interpersonal constraints include breach of privacy, loss of focus, harassment, alteration of working relationship, and reduction in performance standards all of which the study shows can be managed through proactive engagement

and or communication (Sarapinas & Sūdžius, 2011). Therefore, as explained in the above study, enhancing stakeholder relations enhances system flow as seen in the TOC as a framework of dealing with these kinds of restricting factors in the communication process.

Stakeholder management and communication aligned with the Theory of Constraints (TOC) by addressing interpersonal and organizational constraints that impeded project implementation. As Goldratt (1984) explained, TOC focused on identifying and eliminating system constraints, which in infrastructure projects often manifested as communication barriers between stakeholders. The participants' emphasis on regular meetings and open communication channels demonstrated a practical application of TOC principles by proactively identifying and removing these constraints before they affected project progress. Sarapinas and Sūdžius (2011) noted that interpersonal constraints such as misunderstandings, altered working relationships, and reduced performance standards could be effectively managed through the type of proactive engagement described by the interview participants. This approach allowed project managers to enhance system flow by addressing the restricting factors in communication processes, ultimately improving project performance and containing costs.

The focus on stakeholder management and communication was well-supported by contemporary project management literature. Fisher et al. (2020) confirmed that inadequate stakeholder and communication management could lead to conflict situations resulting in cost overruns, validating the participants' emphasis on regular multi-

stakeholder meetings and clear communication. The study findings aligned with Styk and Bogacz's (2022) assertion that effective stakeholder management required identifying stakeholders, understanding their needs, and adopting appropriate communication processes—precisely the approach described by participants like P1 who emphasized engaging community members early in the project. However, the literature also offered important cautions, with Khahro et al. (2023) warning against over-reliance on stakeholder engagement, which could negatively impact decision-making. Conversely, Sheppard and Beck (2020) cautioned that insufficient stakeholder interaction might lead to reduced public support and political interference, reinforcing the participants' balanced approach to stakeholder communication that facilitated timely feedback while maintaining project momentum.

Theme 4: Political and Administrative Challenges

Other challenges associated with cost overruns in infrastructural projects include political and administrative issues. The interviews revealed that aspects like political influence, bureaucracy, and timing issues in the provision of funds were some of the hassles that could upset project costs. These pressures were perceived not only as threats coming from the environment but as internal constraints typical for the industry and that need to be managed effectively in order to have a positive influence on the cost control process (Ajmal et al., 2020). They identified different approaches that they have used on how the challenges present themselves in the project life cycle.

One of the major issues brought out in the discussions was the disturbing incidence of political interferences especially in matters of project defining and decision

making frameworks. As stated by P1, “Critical thing for cost overruns in government projects is... the government themselves... They will start out with X because of political... interference or want to score political mileage.” Political leaders may come up with additional features which were never in the planning in an attempt to try to meet their set goals or political interests. This can also cause scope creep where additional changes result in greater challenges and costs. In such situations, thus, it becomes a delicate balancing act in order to implement the project despite political pressure.

A number of the participants pointed out that bureaucratic issues as obstacles in their work, which can be described as time delays, slow decision making, and procurement procedures. Participant 4 (P4) said, “Sometimes in order to... spin allotted money, they may say let's do something because we need to spend this money before the financial year runs out.” The lack of streamlined processes and bureaucratic obstacles such as slow approvals can also affect the project progress and cause unnecessary delays. Similarly, when project durations are associated with financials or political regime, there is sentiment towards speed and this may adversely affect quality of deliverables or, decisions made which may be costly in the long run.

Another political factor that affects cost management is the timing of the budget allocation. Closely related to the aforementioned is the problem of using up available finances within a given time span, even when it results in poor time and cost control in a project. This was brought out particularly by P3 who said, “If you are going to operate within an area or a country that has issues with violence and extortion... you need to plan for that.” Some of the external pressures include time pressures resulting from political

and financial systems, make the undertaking of infrastructure projects a risky endeavor. Time constraints may result in more frequent changes of the budget and in cases of insufficient funds, a situation that may slow down the project and lead to overspending. The structure and bureaucracy within the government cause complexity in the business's management of projects. Inefficiencies can arise within the bureaucracy system which causes paralysis of decision making and consequent stoppage or slowing down of the project or procurement process. P2 noted that, "In government projects, you sometimes have the issue of not having the right approvals at the right time." Such barriers cost time and money since they extend the duration required to complete a project and may alter the original plans made by the contractors and project teams by requiring them to repeat certain steps (Santos & de Carvalho, 2022).

Some of the approaches that were proposed by several participants to reduce the effects of political and administrative risks included identification of stakeholders and engaging them and timely communication with them. During the study, Participant 4 (P4) mentioned the importance of "having clear conversations from the start and clear communication from the start about what is required and what is expected." Political pressure can be prevented if political leaders and government officials are included in the planning phases of the project and their expectations managed properly. Furthermore, the approaches of effective documentation and approval were highlighted as methods of monitoring the approval procedure to prevent or reduce the occurrence of such breakdowns. For instance, P1 indicated that, "If there's a variation that is... a similar work within the existing thing, the existing rates would apply," thus expressing awareness that

records have to be kept and procedures followed to ensure that no violation occurs and costs skyrocket.

This finding is also consistent with the Theory of Constraints The theme of political and administrative challenges relates to the Theory of Constraints (TOC) by highlighting how external constraints such as political interference, bureaucratic delays, and budget timing issues can limit the progress and success of infrastructure projects. TOC compares bottlenecks as narrow conduits that limit the flow of a system and allows only a fixed volume to pass across it at a given time. In the context of infrastructure projects, political and administrative constraints are some of the biggest impediments that affect the progress and cost of the project (Gade, 2016). This research evidence shows that political influence and bureaucratic issues cause uncertainty and scope changes, thereby delaying decision making and budgets. By dealing with them upfront through enhanced project governance and improved communication as well as engaging stakeholders, it becomes possible to minimize their effects especially on the workload flow of the project. From the TOC standpoint, it is evident that eradicating these political and administrative barriers is crucial to maximize the project's performance while adhering to the given budget and time frame.

Political and administrative challenges aligned directly with the Theory of Constraints (TOC) by identifying how external pressures functioned as system-level constraints that impeded project success. As Goldratt (1984) explained, constraints could take various forms, including the policy constraints and bureaucratic obstacles that participants identified as significant barriers to cost management. The research findings

demonstrated how political interference, bureaucratic delays, and budget timing issues created bottlenecks that limited the flow and progress of infrastructure projects, mirroring what Gade (2016) described as impediments affecting project cost and advancement. When participants highlighted issues such as politically-motivated scope changes and budgetary timing pressures, they were essentially identifying what TOC would classify as policy constraints. Sarapinas and Sūdžius (2011) emphasized that identifying and managing such constraints was essential for project certainty, which was reflected in participants' strategies to mitigate political and administrative challenges through enhanced stakeholder engagement and documentation procedures.

The focus on political and administrative challenges was strongly validated by contemporary literature on infrastructure project management. The participants' experiences with political interference and bureaucratic obstacles aligned with findings from Catalão et al. (2020) and Chadee et al. (2022), who identified political factors as major drivers of cost overruns requiring improved corporate governance. The participants' emphasis on transparent communication and documentation supported Honig et al.'s (2022) argument that large-scale public projects demanded transparency and accountability institutions. When participants discussed the challenges of budget timing and political meddling, they echoed Bisogno and Cuadrado-Ballesteros' (2021) observation that transparent budgeting and progress reporting were essential for project accountability. Furthermore, Chang et al. (2021) reinforced the importance of anti-corruption measures like conflict of interest legislation and whistleblower programs, which complemented the participants' strategies for managing political pressures. While

participants acknowledged these external factors were not entirely within their control, their approaches to mitigating political and administrative challenges aligned with the literature's emphasis on creating favorable environments for cost-effective implementation.

Theme 5: Technology Integration and Innovation

Most infrastructure projects are dependent on technology for the implementation of projects that ensure effective completion of the project through the application of various technologies which assist in efficient project management, planning and executing the projects. The need to adopt technology also came out clearly from the interviews since it assists in tracking and controlling costs, and also improves on resource management and decision-making. They pointed different technological tools including BIM, project management software and communications technology as critical tools for handling big infrastructure projects funded by the government (Sampaio, 2022). These innovations are already revolutionizing how projects are developed, managed, and controlled, enhancing the prospects of developing projects that will bear no cost overruns.

One of the technological advances mentioned by the participants was the Building Information Modeling (BIM). This integrated digital tool coordinates the aspects of the project work, such as architectural, mechanical, electrical and plumbing, designs. P2 continued to expound by saying, “Our total platform is being based on Building Information Modeling that integrates Architectural, Mechanical, Electrical, Plumbing, and Fire design.” This makes communication of all project data accessible to all concerned stakeholders, thus avoiding use of old data that may have led to development

of wrong results that will end up increasing the cost of the project. Furthermore, through the BIM cognitive visualization of project simulation and the identification of potential collision before construction commencement, the project managers are well positioned to correct work plans' impediments in this phase rather than during construction (De Gaetani, Mert & Migliaccio, 2020).

It also encompasses other types of software applications used apart from BIM in the management of project information and progress, resources, and costs. Participant 5 (P5) highlighted, "We use computer software... we try to keep virtual meetings because we know that each can meet online," showing that applying technology also strengthens interaction. Such utilities check and manipulate, among other things, to ensure that all the working teams and interest groups are on the same page in terms of objectives and project schedules (De Gaetani, Mert & Migliaccio, 2020). It also helps in performance tracking and cost estimating, where the deviation makes it possible for the project managers to check and rectify the over expenditure promptly.

The participants also pointed out that cost control tool is a critical instrument in terms of the financial side of the projects. Participant 3 (P3) noted, "The software usually shows this up, and you take action accordingly... prices do not always go up. There are sometimes that prices go down." These software solutions provide a real-time work with spent money, helping to understand the project's financial status. In particular, discrepancies between planned and actual costs are likely to be detected at an early stage of the project, so it will be easier to prevent them from growing into major overruns.

Also, the use of cost controls, especially cost forecasting tools keep project teams abreast with the probable future costs in order to avoid underfunding of a project in the future.

The relevance of communication in most large and intricate projects cannot be overemphasized because one aspect, which often leads to cost overruns, is inadequate communication among project stakeholders. Participant 1 (P1) shared, “We use Pro Core... we use that to ensure that everybody is aware of what is happening.” Using Pro Core and similar platforms, facilitates appropriate communication between all parties involved in the project such as contractors, government personnel, and subcontractors. These tools are used for the main purpose of informing other members of updates or changes facing the project, concerned discussions, as well as decision making, thereby eliminating confusion and/or deviation from what has been planned.

In addition, meetings and remote work have also become possible through technology which was very helpful during the Covid-19 pandemic. As for the flexibility of these tools, P 5 noted, “We try to keep virtual meetings... we know that each can meet online.” The enhanced capability for virtual project platforms facilitates continued functioning of project teams even when physical interactions are prohibited, and it finishes work without interruption (Morrison-Smith & Ruiz, 2020). Finally, the participants also confidently looked at the future role of new technologies in enhancing project management, despite the current advances in technology. Specifically, participant 5 (P5) highlighted on one of the virtues of AI as they said, “We use AI... to help guide us or to determine where at a particular point in time the project should be in terms of tracking it.” The deployment of artificial intelligence in cost estimation, risk calculation

and scheduling serve as a potential innovation for project management of infrastructure projects because, improved estimates increase chances of accurate predictions the other three areas while automating standardized processes will enhance high end decision making through freeing up of human resource (Sahadevan, 2023).

This theme is consistent with the Theory of Constraints (TOC) because it emphasizes the role of technological tools in identifying and alleviating constraints that limit project efficiency. TOC suggests that improving the performance of a system requires identifying and addressing the most significant bottlenecks, and in infrastructure projects, these can often be related to communication, resource allocation, and cost tracking (Goldratt, 1984). The study's findings highlight the use of technologies such as Building Information Modeling (BIM), project management software, and AI-based forecasting as essential tools for streamlining processes, reducing errors, and enhancing coordination across project teams. These technologies help manage constraints by improving data accuracy, enabling real-time decision-making, and allowing for better resource and cost management. By incorporating such innovations, project managers can remove inefficiencies in project execution, reduce delays, and prevent cost overruns, thus improving the overall flow of the project.

Technology integration and innovation aligned perfectly with the Theory of Constraints (TOC) by addressing the technological constraints that hindered project efficiency. As Goldratt (1984) established, identifying and addressing system bottlenecks was crucial for optimizing performance, and the participants' implementation of technologies like Building Information Modeling (BIM) and project management

software represented practical applications of this principle. These technological tools enabled project managers to identify constraints early in the process, particularly in communication, resource allocation, and cost tracking, which Sarapinas and Sūdžius (2011) noted was essential for project certainty. Parker et al. (2015) advocated for integrating TOC with traditional project management approaches, which was exemplified by participants who combined conventional practices with digital innovations to enhance efficiency. Through technologies that provided real-time monitoring and decision-making capabilities, project managers applied TOC's focus on constraint elimination to reduce inefficiencies, prevent delays, and maintain budget control, ultimately improving the overall flow of infrastructure projects.

The emphasis on technology integration and innovation was supported by contemporary literature on infrastructure project management. The participants' adoption of Building Information Modeling (BIM) and specialized software aligned with Sami Ur Rehman et al. (2020) assertion that technological integration enhanced project performance and effectiveness. When P2 described implementing BIM to integrate architectural, mechanical, electrical, and plumbing designs, they demonstrated what Deore and Joshi (2024) identified as key factors in minimizing design clashes and improving lifecycle costs. The participants' use of project management software for real-time monitoring reflected Chen et al. (2023) findings that such technologies facilitated planning, scheduling, and resource allocation, making project control more effective. Participants' discussions of cost control tools and AI applications for tracking mirrored Nanda and Kumar (2022) observation that data analysis technologies enhanced decision-

making and reduced expenses. However, as noted by Maali et al. (2020), successful technology adoption required adequate training and change management practices, a consideration echoed by participants who emphasized the importance of proper implementation. The findings also supported Baduge et al. (2022) view that artificial intelligence held significant promise for transforming cost estimation and risk management in infrastructure projects.

Business Contributions and Recommendations for Professional Practice

This study offers significant contributions to the field of infrastructure project management, specifically in the context of government-funded projects. Given that the study outlines major factors contributing to cost overruns, practical suggestions for improvement in cost control can be of great benefit to the business organizations especially those concerned with procurement and management of public projects. It thus brings out the need for better understanding on how cost control, risks management, stakeholders, and technology are some of the factors that if well managed can lead to the completion of large infrastructure projects on a shoestring budget. The following are the significant contributions to business practice.

Emphasis on Comprehensive Planning and Risk Management

This study affirms the principles of early planning and risk management resulting from the study. It is undeniably evident from the study that adequate initial planning, risk analysis, and creation of contingency funds are effective methods that can be used in controlling instances of cost overruns. For enterprise that operate in construction and infrastructural areas, this supports the argument that adequate resources should be put on

the planning phase to reduce the risks that are likely to be encountered. This approach also enables one to control the costs associated with the project while at the same time fostering for the success and stability of the projects.

Cost Control and Monitoring Systems

The research also emphasizes that cost control systems and monitoring procedures are of significant importance for managing expenses in the process of a project. Through the use of proper project management, cost tracking software and other performance metrics would enable one to track costs better and also make changes in case of any variance. As such, organizations should consider sourcing for these tools for the purpose of strengthening their capacity to monitor costs in various projects, across their entirety of the project life cycle. Such systems also help businesses to forecast future costs and, therefore, make the necessary changes to the utilized resources.

Stakeholder Management and Communication

Effective stakeholder management and communication are central to preventing misunderstandings and project delays, both of which can lead to cost overruns. The study also reveals that stakeholders should be kept informed and engaged through scheduled meeting and other communication forms. For businesses, this means that project managers should ensure that all stakeholders – contractors, the community, governments and various other interested parties – are on the same side with regards to the goals of the project. Open communication minimizes the likelihood of a project growing out of control and exceeding an established scope, changing, or leading to a dispute, which are the causes of a high cost.

Navigating Political and Administrative Challenges

Another significant contribution of the study is its emphasis on the impact of political and administrative challenges on project costs. This study also finds that political interferences, administrative inefficiencies, and timing of funds hamper the infrastructure projects. To the businesses that undertake public sector projects, the study recommends the formulation of measures to deal with these political and administrative factors. This involves the contact of the political stakeholders from the initiation phase, considering political and fiscal calendars in scheduling activities, and ensuring adequate political will in order to secure approvals before the corresponding times.

Technology Integration for Improved Efficiency

The incorporation of BIM in technical processes and the use of AI forecasting was established to enhance the performance of the projects. These tools go beyond simply improving coordination of communication but also address cost management, resources and time management and scheduling. Many construction and infrastructural companies in today's world are advised to opt for modern equipment to enhance the working of projects. A development of digital technologies and applications enables minimizing the number of mistakes, improving the decision-making processes, and tracking the project costs and progress in real-time, which might lead to better cost control and tighter deadlines.

Implications for Social Change

The findings of this study have significant implications for social change, particularly in the context of improving the delivery of infrastructure projects in

developing nations. Governments make it a priority to fund infrastructural projects as they are important for the social and economic improvement of people's lives. However, when it comes to these projects the consequences of such a scenario are equally dire: the benefits are achieved with a delay, the public resources are stretched, and the citizens' confidence in the authorities is undermined. In so doing, this paper offers practical modalities on how the cost overrunning concern can be controlled to safeguard the efficient spending of public resources in order to support timely and affordable delivery of infrastructure facilities to the benefiting society.

Applying a number of specific principles in project management like identification of risks at the early stages and engaging the project's stakeholders besides integrating information technology in the management process helps avoid such wastage by directing organizational resources on specific projects that will in turn enhance the quality of citizens' lives. For instance, by utilizing elements such as BIM, one can manage resources better, eliminate wastage, and enhance efficiency; in the case of cost control, tracking systems help in directing funds for the development to the right areas that impacts local economies. Additionally, the proposed CFR model also means that the political influence and bureaucratic hindrances that were noted in the study will be minimized; managing projects will be more efficient since there will be little political interference. This contributes to the development of trust since people will be willing to support infrastructure projects knowing that the resources required to undertake the projects are well allocated to suit the needs of the society. Thus, the study presents a viable course of action for directing change in the direction toward more stable and

socially appropriate development of social infrastructures so that communities can accrue the maximum benefit from the money spent by the government to create infrastructure projects. The implications for positive social change include the potential for project leaders and government decision-makers to improve infrastructure investments' efficiency and sustainability, thereby enhancing public service delivery to local communities.

Recommendations for Further Research

Even though this study gives significant recommendation on approach to containing costs in government-funded infrastructure projects, some aspects may require further study in order to gain a more sophisticated understanding of appropriate practices in the area.

Longitudinal Studies on the Impact of Technology on Cost Control

There is need for further study to analyze the long term use of the technology solutions seen as being critical in managing infrastructure projects such as Building Information Modeling (BIM) integrated with Artificial Intelligence (AI) based forecasting to determine respective effects on project costs and its control. Longitudinal research can also monitor whether the implementations of these technologies in a specific project could also be used in other projects as ways of evaluating the efficiency in cost reduction and achievement of intended project goals. This research could open some light on how adoption of the technology happens in the evolution of the industry and its sustainable effects on the management of costs.

Comparative Analysis Across Different Geographical Regions

There is also a need for a more comparative analysis of various geographical regions and cultures, regarding primarily cost control in infrastructure projects beyond Jamaica. This study would investigate the factors regarding each region that lead to cost overruns and/or seek to understand why such occurrences are more prevalent in developing nations and how systematic political, economic, and social causes can affect costs in the region. It may provide useful information on the application of best practices drawn from around the world that suit certain regional differences.

Impact of Political and Administrative Factors on Long-Term Project Success

Further research could also examine the long-term effects of political and administrative factors on the success and sustainability of infrastructure projects. This can incorporate studying the extent of how politics affects initiation, funding, allocation, implementation, monitoring, and evaluation of projects as well as how changes in political leadership impacts project development. It could also give a good insight on how to strengthen political and administrative measures in order to achieve better results and more sustainable project continuation.

Effectiveness of Stakeholder Engagement Strategies

Possible directions for further research may concern with the evaluation of distinct approaches to stakeholder engagement in different sectors of activity (for instance transportation, healthcare and energy). Research may determine how communication channels, communication threads, community engagement, and information sharing tools influencers gain stakeholder engagement, minimize conflicts,

and, consequently, reduce costs of projects. This will further assist in defining how exactly to enhance the engagement of the stakeholders in the initial stage so that the project implementation process becomes seamless.

Conclusion

In conclusion, it was discovered that effective planning, ongoing cost monitoring, stakeholder collaboration, political navigation, and technological integration are basic factors crucial for minimizing cost overruns in government funded infrastructure projects. Comprehensive planning and proactive risk management are crucial for reducing cost overruns because when project managers perform adequate initial risk evaluations, assess the relative level of those risks and, putatively assign adequate amounts of contingency money, then chances of cost overruns can be minimized significantly. This approach is in line with the objective of the study aimed at establishing measures that help in avoiding escalation of cost during project life cycle. It emerged that having clear strategies and concrete plans at the beginning and it is crucial and continuing with frequent risk analysis and refined budgeting.

Another conclusion was that cost control and monitoring were a crucial aspect of chain operations. Software programs that support project management and constant tracking of costs were reported as mandatory procedures to meet expenses within the prescribed budget. Other areas that were considered important in budget management include cost control, where managers conduct routine cost analysis, initiation of performance measures and active budgeting of the forecasts, in order to help identify early the slight aberrations before they turn into major issues. The identified points fulfill

the study's objective of analyzing the methods of financial management of infrastructure projects and assert that monitoring is inextricable in the processes of maintaining costs under control.

Other important strategies highlighted for minimizing cost overruns include the management and communication with stakeholders. It was discovered that communication of all the stakeholders, reduced misunderstanding that might cause delays or higher costs. More so, the research revealed that more frequently scheduled meetings facilitated by open communication channels and stakeholder involvement and engagement at the project's beginning are crucial to foster mutual understanding of the project objectives and goals. This is in accordance with the objective of this study, which was to establish the relevance of collaboration when it comes to cost management. Political and administrative factors were also found to have influenced the cost overrun due to increased costs related to political instability. In light of the study, one cannot overstate that it is highly important to exercise effective management of political and administrative risks in order to minimize positive impacts on the project's time and costs.

Finally, the application of technology and technology advancement came out in the final agenda for enhanced efficiency and cost control in a project. BIM application, digital project management, and AI-based forecasting enabled better outcomes along the project performance indicators in coordination, lower errors and cost control. All of these technologies relate closely to the research goal of identifying better ways of using contemporary tools for Infrastructure projects.

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Appendix A: Participant Invitation

There is a new study about the successful strategies used by project managers on government infrastructure projects to better understand and help reduce cost overruns. For this study, you are invited to describe your experiences successfully managing government infrastructure projects without cost overruns.

About the study:

- One 25-35 minutes face-to-face interview that will be audio recorded (no video recording)
- To protect your privacy, the published study will not share any names or details that identify you

Volunteers must meet these requirements:

- 18 years old or older
- Experience in managing government infrastructure projects
- Experience with projects that have effectively mitigated cost overruns.

This interview is part of the doctoral study for Owen Whitely, a DBA student at Walden University. Interviews will take place during December, 2024 to January, 2025.

Please email (redacted) to let the researcher know of your interest. You are welcome to forward it to others who might be interested.

Appendix B: Consent Form

Interview of Professionals Consent Form for DBA Qualitative Pragmatic Inquiry Doctoral Study

You are invited to take part in an interview for a study that I am conducting as part of my Doctorate of Business Administration research.

Interview Procedures:

If you agree to be part of this study, you will be invited to take part in an audio-recorded interview about your professional experiences. Opportunities for clarifying statements will be available (via a process called member checking). Transcriptions of interviews will be analyzed as part of the study, along with public documents and records.

Voluntary Nature of the Study:

This study is voluntary. If you decide to join the study now, you can still change your mind later.

Risks and Benefits of Being in the Study:

Being in this study would not pose any risks beyond those of typical daily life. This study's aim is to provide data and insights that could be valuable to people in your profession. Once the analysis is complete, the researcher will share the overall results by publishing the final study on the Scholarworks website.

Privacy:

Interview recordings and full transcripts will be shared with each interviewee, upon request. I am required by my university to protect the identities of interviewees and their organizations, within the limits of the law. I am only allowed to share interviewee identity or contact info as needed with Walden University supervisors (who are also required to protect your privacy) or with authorities if court-ordered (very rare). Any reports, presentations, or publications related to this study will share general patterns from the data, without sharing the identities of individual participants or their employers. If I were to share this dataset with another researcher in the future, the dataset would contain no identifiers so this would not involve another round of obtaining informed consent. Data will be kept secure by password protection. The interview transcripts will be kept for at least 5 years, as required by my university. The collected information will not be used for any purpose outside of this study.

Contacts and Questions:

If you want to talk privately about your rights as a participant, you can call the Walden University Research Participant advocate via (phone number redacted). Walden University's ethics approval number for this study is 12-06-24-1192625.

Please share any questions or concerns you might have at this time. If you agree to be interviewed as described above, please reply to this email with the words, "I consent."

Appendix C: Interview Protocol

During the first part of the interview, informed consent (Appendix B) and rapport building will be discussed. If the interviewee has any questions, I will ask them. In a semistructured approach, I will ask the interview questions in order, but follow up with related questions as necessary if a particular answer appears to provide additional information that might clarify the research question. The following questions will be asked during the interview:

Interview Questions

1. What are the most successful strategies have you implemented to prevent cost overruns in government-funded infrastructure projects?
2. How do you approach budget planning and cost estimation for large-scale infrastructure projects to minimize the risk of overruns?
3. What role does risk assessment play in your project management process, and how does it help in controlling costs?
4. What example can you share of a challenging infrastructure project where you successfully avoided cost overruns, and what specific methods did you use?
5. How do you manage relationships with contractors and suppliers to ensure they adhere to the agreed upon budgets and timelines?
6. What monitoring and control systems do you have in place to track project expenses and identify potential cost overruns early?
7. What are the most common causes of cost overruns in government-funded infrastructure projects, and how do you proactively address them?

8. How do you handle unexpected changes or scope creep during a project without allowing costs overruns?
9. What strategies do you employ to improve communication and coordination among various stakeholders to prevent misunderstandings that could lead to cost overruns?
10. What innovative technologies or management approaches have you adopted that have proven effective in controlling project costs?

After the interview, I will answer all participants' questions. I will provide them with a transcript and summary of themes from the interview, and they will have 72 hours to review and let me know if changes are needed.

Appendix D: Exemplar Member Checking Email

Dear Sir,

Thank you for participating in my research study on successful strategies for reducing cost overruns in government funded infrastructure projects in Jamaica. Your insights, drawn from over 25 years of experience as a project manager and quantity surveyor, were invaluable. I would like to verify my interpretation of three key points from our discussion:

1. Early Planning and Risk Assessment You emphasized the critical importance of comprehensive planning in the initial stages, particularly for underground services. As you noted: "What we have done in that regard is to look at serious planning in the initial stages... If the government has approached us to manage a road project, we will say to them what about underground services, water, sewage, telecommunications, electricity, so that we plan for those."

2. Community Engagement and Local Knowledge You highlighted the value of local community input in infrastructure projects. As you stated: "One of the things we learn as project managers is that for infrastructure projects, when you go to certain areas to work, the first people you need to talk to are the people who live in the community." This approach helps in making informed decisions about infrastructure specifications based on local conditions.

3. Systematic Cost Monitoring You described implementing a structured monitoring system, including: "We use project management software that shows items on the critical

path and tracks costs... we implement a weekly budget planning system where during technical meetings, we review cost reports that show payment trending."

Could you please review these interpretations and let me know if any adjustments or clarifications are needed? Your feedback will ensure the accuracy of my research findings.

Thank you again for your time and expertise.

Best regards,

Owen Whitely

Doctoral Candidate, Doctor of Business Administration (DBA)

Walden University