

Case Report

Systemic Issues Influencing Technical Certainty in Social Housing Programmes in a Small Island Developing State

Aaron A. Chadee ^{1,*}, Indrajit Ray ¹ and Xsitaz T. Chadee ²

¹ Department of Civil and Environmental Engineering, The University of the West Indies, St. Augustine, Trinidad and Tobago; Xsitaz.Chadee@sta.uwi.edu

² Department of Physics, The University of the West Indies, St. Augustine, Trinidad and Tobago; Indrajit.Ray@sta.uwi.edu

* Correspondence: aaronchadee@hotmail.com

Abstract: Underestimating costs in major public sector social infrastructure development projects is a highly contested and problematic issue. Several gaps exist in the identification of root causes of cost overruns. Behavioural science academics advocate political and psychological explanations as root causes for cost overruns against technical factors, such as errors and omissions by engineers, practitioners and scientists. Most studies in this field primarily concentrate on developed countries. Although some studies have been undertaken in developing countries, very little attention is given to the Small Island Developing States (SIDS). This paper presents a case study of public sector social housing construction programmes in a Caribbean SIDS to further understand the root causes of cost overruns. Primary and secondary data spanning across two different political cycles were collected to test the concepts of whether political influences or technical influences are the true root causes of cost overruns. It was found that political explanations based on the psycho-strategic concept are the leading sources of cost risks on the final estimated contract price. This study strengthens the argument and discusses how strategic decisions emanating from the political directorate outweigh and influence informed technical decisions formulated during the planning stages.

Keywords: cost overruns; political influences; root causes; public housing programmes; Small Island Developing States



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1. Introduction

An issue that is central to project management (PM) is the problem of cost overruns in social infrastructure development projects. Several studies in a wide range of fields, such as road, bridges, dams, and other infrastructure developments, have provided substantial data on these large-scale projects' failures over the last five decades in developed countries [1–3]. Notwithstanding this interest internationally, there is limited literature on any substantive studies on cost overruns undertaken in Small Island Developing States (SIDS). The United Nations classified SIDS as a special case for developmental support internationally because of their fragile natural environments, limited natural resources and domestic capacity, higher costs for infrastructure and energy, and high economic dependence on a selected few developed economies [4]. Cost overruns on social infrastructure projects often exceed hundreds of millions of dollars and can be substantial enough to impact the economy of SIDS. The worldwide phenomenon of cost overruns in social infrastructure development projects continues to prove resistant to modern governance, engineering and technical controls and best decision-making practices. Decision-makers in developed nations, where accountability and governance practices in public spending are more robust than developing nations and by extension SIDS, are unable to curb the pervasive nature of cost creep. In this respect, Trinidad and Tobago, a Caribbean SIDS and an emerging economy, provides a unique case as a bridge between developed and developing nations.

Flyvbjerg, Holm and Buhl [2] and Flyvbjerg [5–7] showed that average cost overruns for infrastructure projects could vary between 20.4% for roads, 33.8% for bridges and tunnels and 44.7% for rails. These figures may well be within the conservative side of the cost overrun curve and are vastly different from Love [8] and Love and Ahiaga-Dagbui [9], whose average cost overruns were estimated at 13% for roads and 5.5% for bridges. Cost overruns exceeding 100% of the initial approved estimates or contracted sums continue to be prevalent in infrastructure development projects. One example is the UK's HS2 major rail project. Initially budgeted at 32.7 billion pounds and revised to approximately 55.7 billion pounds [10], it is expected to exceed 100 billion [11]. Denver's airport and the Scottish Parliament Building, with cost overruns of 200% and more than 900%, respectively [8], are two infamous projects that were investigated to provide plausible solutions to the mismanagement of taxpayer's dollars.

Despite continuous extensive research in civil engineering infrastructural projects to explain this phenomenon, cost overruns remain unsolved for both shareholders and governments worldwide. Several approaches, ranging from conventional technical methods driven by empirical mechanisms to unconventional techniques framed on behavioural sciences, have been proposed and tested. Imperfections in governance models, organisation structures, methods, processes, techniques, tools and training can either be viewed as inefficient or inadequate in curbing project underestimation [12,13]. The cost overrun phenomenon is not an emerging culture within the infrastructure project's niche environment but an existing culture systemic in projectised organisations. Such cultures manifest symptoms resistant to theoretical constructs, creating further ambiguities in root causes and explanations. Creep in cost certainty in major social infrastructure projects is the norm rather than the exception and warrants further investigation for the accountability of the tax payer's contributions.

This paper examines the root cause of such cost overruns, within the context of public sector social housing programmes (PSSHPs), with a view of curbing losses and improving the theoretical shortcomings in project and construction management. PSSHPs were selected as the context of this research due to the government's intervention in assisting its lower-income citizenry in obtaining the basic need of shelter. The state typically provides these programmes' construction costs through various mechanisms [14], such as subsidised land and housing costs, together with a variety of flexible payment options. As cost overruns on infrastructure have the potential to negatively impact the overall economic activities of SIDS [4], the main aim of this research is to examine whether the root cause of cost overruns is due to political influences or technical influences. The research objectives are to determine the extent of cost overruns due to political and technical influences on PSSHPs and, consequently, how these vested influences affect the programmes' final cost performance. Finally, the research investigates an alternative scenario of whether the absence of manipulation of technical causes can curb politically vested influences and reduce cost overruns on PSSHPs.

2. Literature Review

Leading practitioners, academics and researchers across the globe, within the field of Behavioural Sciences, have provided a variety of explanations for cost overruns ranging from ethical considerations [15], deception [16], delusion [2,3], overcommitment of decision making to an ineffective course of action [17] and cultural behaviour [18].

Flyvbjerg, Holm and Buhl [2] and Flyvbjerg [5] placed the spectrum of explanations into four categories. The first, technical explanations, involves the grouping of technical causes such as the inadequacy of project data, changes in project specifications [19], unreliable forecasting models [20], errors [21] and technical experiences [22]. The second explanation, economical, accounts for macroeconomic variables (currency fluctuations, Gross Domestic Product and investments based on international rating agencies' economic outlook) and public–private interests to self-interests. Third, psychological explanations capture errors created by individual biases based on a cognitive predisposition to estimate

future outcomes optimistically, even though previous experiences depict a contrary response. Psychological explanations are consistent with systemic biases in decision making based on an individual's cognitive disposition to risk [3,5,23]. Finally, the political environment and explanations may involve the deliberate distortion of technical models to gain support and approvals for a favoured project. This deliberate action is known as strategic misrepresentation [24] and involves actors either internal to the project or external.

Project plans are always subject to risks, such as scope changes, delays and inflation, leading to cost overruns. These sources of risks are typically beyond the control of the project team, and a contingency sum is typically added to the project budget to offset costs associated with any deviations from the planned budget. This contingency is typically estimated at 10% of the project budget, but cost overruns rarely fall within the allowable contingency. Mainstream technical explanations of cost underestimation vary from deviations from engineering processes and practices (for example, insufficient data, design errors, inadequate scoping, changes in design criteria, codification, etc.), risk capturing and mitigation as well as procurement and financing arrangements. Scope definition and creep [25,26] and errors based on design and/or omission [8] are the more popular technical factors contributing to tensions within the project team, with cost escalations ensuing.

Technical justifications for unreliable forecasting could not be the root cause of cost overruns [16]. The results from decades of projects' forecasting models have not improved the accuracy of cost estimates. This theoretical foundation was built on the concept of the planning fallacy [23,27], attributed to project actors' behaviour systematically underestimating risks and overestimating benefits of the same planned action. This fallacy is due to actors taking the "inside view", focusing on the decomposition of the specific planned action rather than learning from outcomes of similar actions already completed. Utilising the outcomes and distributional information of similar actions was identified as a solution for the planning fallacy, known as taking the "outside view" [28]. Additionally, Flyvbjerg, Bruzelius and Rothengatter [29] espoused the political root causes in terms of strategic misrepresentation. Their findings also suggested that decision-makers strategically and intentionally underestimate costs while overstating benefits to improve a project's favourability for selection, acceptance and financing. The proposed solution of de-biasing front-end estimates of costs and benefits began to lead the discussion on cost overruns mitigation in major transportation projects. This theoretical view culminated in dispelling technical explanations and concluding that psychological and political explanations are the main root causes of cost overruns.

Love and Ahiaga-Dagbui [9] challenged the factual accuracy of Flyvbjerg, Garbuio and Lovallo's [16] work and argued against delusion (optimism bias) and deception (strategic misrepresentation) being the leading root causes for cost overruns on mega projects. Love and Ahiaga-Dagbui [9] went as far as to classify these outputs as "fake news" and advocated the scientific and technical school of thought for evidence-based research to guide investigations into the causes of cost overruns. They categorised the two popular schools of thought as Evolutionist and Psycho-Strategists. Evolutionists believe that overruns result from technical limitations and complexity in decisions, while Psycho-Strategists espoused the concepts of planning fallacy, delusion and deception.

Choosing a school of thought has not sought to close the gaps in understanding the cost overrun phenomenon. Quite the contrary was witnessed between the current debate by leading academics in this field [9,30–32]. This gap is ever-growing in the absence of theoretical mediating mechanisms underpinning and juxtaposing philosophies from the Evolutionist followers and the Psycho-Strategist behavioural followers. The widening of the theoretical gap in cost overruns is also disadvantageous for SIDS, whose shortcomings are defined by inadequate infrastructure coupled with economic challenges and limited access to affordable financing [4]. As project actors reflect on leading academic knowledge to update and improve current practices, this research develops a theoretical framework to review the systemic issues contributing to root causes of cost overruns in a SIDS's public sector social housing programme.

3. Theoretical and Conceptual Framework

The conceptual framework for cost overruns is based on two contemporary dominant concepts: the Evolutionist and the Psycho-Strategy notions.

Evolutionists, proponents of the evolution theory, such as Love, Ahiaga-Dagbui and Irani [33], suggest that cost overruns are primarily due to issues surrounding technical complexities such as design errors, scope changes, procurement limitations, tools and techniques.

The Psycho-Strategy theory espouses that the leading causes of cost overruns are due to psychological and political influences [16]. An individual's psychological state (for example, a planner) and the person's own inherent biases, such as optimism bias, constitute psychological influences. Political influence is typically strategic to deceive the realistic outcome of the project. As such, strategic misrepresentation, or intentionally manipulating project data by reducing project costs and trumping up its benefits to improve the chance of project selection, approval and acceptance, will ultimately result in cost overruns because of the deliberate underestimation of costs.

Both theories affect the rational choice and decision making of the main stakeholders in the project. For public sector social housing programmes, the principal stakeholders are usually the taxpayers and the general public, who reap the benefits of affordable housing and infrastructure. The state organisation selects the project team as agents to act on behalf of the taxpayers to monitor, control and manage services in the project's various phases and ensure that project outcomes can benefit the public. Thus, agency theory may act as a mediating theory of cost overruns (Figure 1).

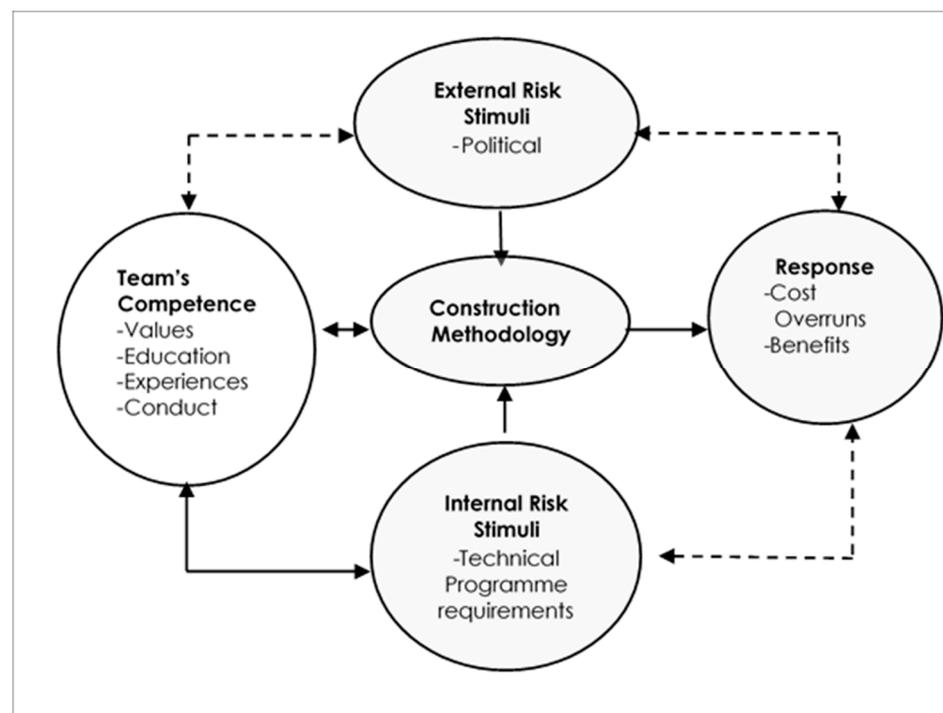


Figure 1. Overall theoretical scope of the research.

The development of the conceptual framework for the research, thus, accounts for the independent variables having an implied relationship, because the agent, i.e., the project team, acts as a mediating variable who controls the outcome of the resulting cost overruns on social housing projects. In other words, technical and political influences affect the project team's ability to control the project, resulting in cost overruns that the principal stakeholder (taxpayer) absorbs. The conceptual model is illustrated in Figure 2.

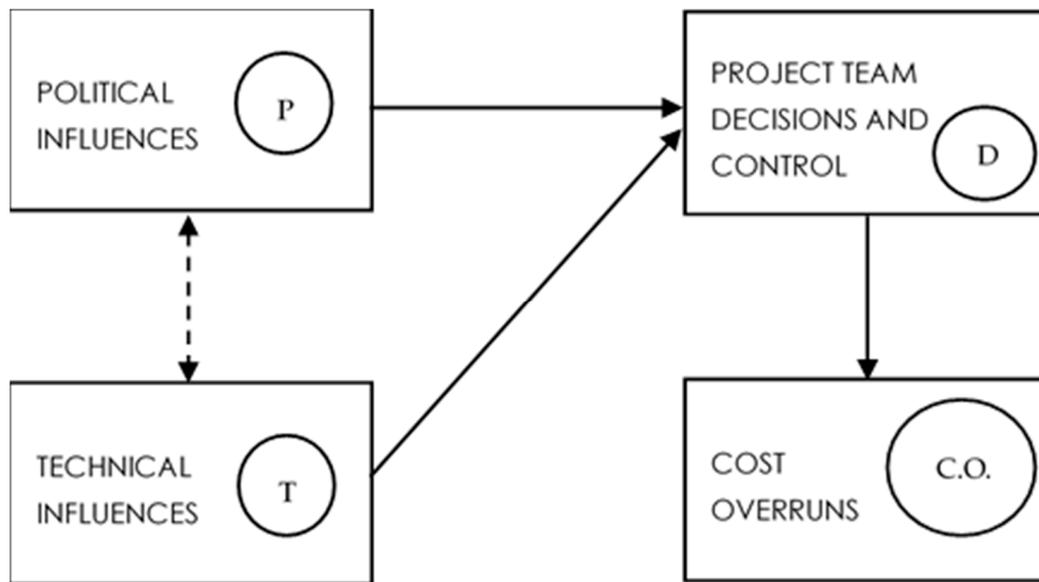


Figure 2. Proposed conceptual framework.

Therefore, a key aspect of cost overruns in social housing programmes is determining whether political influences affect cost overruns to a greater degree than technical influences in SIDS.

From the above theoretical model and conceptual framework, three research questions (R.Qs.) were derived as follows:

R.Q. 1: Is there a change in cost overruns on PSSHPs associated with different political cycles, and if so, how large were the cost overruns experienced?

R.Q. 2: Which of the two root causes of cost overruns (political vs technical influences) was perceived to explain the degree of cost overruns on PSSHPs?

R.Q. 3: Were there any influences on the project team's decision-making capabilities and span of control on associated PSSHPs?

4. Research Method

This research adopts a qualitative methodology to examine the causal nature of cost overruns in social infrastructure projects [34]. A case study approach was adopted to examine cost overruns' systemic issues on PSSHPs in Trinidad and Tobago. Contractual cost data for 82 projects, from the inception of a special purpose, state-owned company [35] in 2005, were collated across two political cycles, with different political regimes, from 2005–2010 and 2010–2015. Infrastructure projects from 2016 are currently ongoing, and complete cost data are unavailable.

The 82 projects were then grouped according to three contractual relationships: Design-Bid-Build, Bespoke and Design-build joint venture partnerships. The Design-build projects and associated data were selected for analyses because they allow for improved reliability and validity of costs as costs for all components of infrastructure, utilities and housing are reported by both the client and the contractor. Furthermore, regulatory bodies give final approvals and certifications for such projects provided that compliance with the initial approval requirements is demonstrated. Of the 82 projects, 26 were design-build projects with 19 projects over the 2005–2010 political cycle and seven projects over the 2010–2015 political cycle.

Data captured from ministerial reports, parliamentary reports, management reports, observations, consultants' and contractor's interviews, websites and the media [33] were used to gather information on reported issues on social housing projects. Semi-structured interviews and conversations with senior project participants representing the client, contractor and consultant also formed part of the data gathering process to verify reported

issues and capture unreported project nuances, observations and expectations [2]. This study also employed pilot surveys from interviews conducted with professionals experienced in projects undertaken by the Housing Agency and the Ministry of Housing and the Environment, Port of Spain, Trinidad and Tobago. Representation from the client, contractor and consultant made up the various survey responses. Responses from a cross-section of the team hierarchy were obtained, including senior project managers, project managers, quantity surveyors, estimators and site officers. The data gathered were used to determine the type of factors and the extent of cost overruns in each social housing project.

Several limitations were encountered during the data collection process. Data collection spanned beyond 36 months due to the increased political sensitivity and media attention of social housing projects administered between the two major political parties in the period of study. All ethical protocols were followed during this prolonged period to protect research participants. The 2005–2010 programme's data were not consistently captured and stored in the Ministry's controlled environment. Data were either lost when project managers resigned or were replaced without a document handover process.

The increased political sensitivity posed a severe limitation in the data capture process as several public officials refrained from being formally interviewed, while several professionals requested anonymity when disclosing information or issues surrounding cost overruns. All ethical considerations for conducting interviews, data control, documentation and storage were observed rigorously in this process. Those who requested anonymity all concurred that a major factor contributing to their hesitation or unwillingness to participate in the research was the possibility of their employment being terminated due to the political volatility of the organisation. All materials on these participants were deleted and physically destroyed to protect such participants' interest.

Project managers who were not employed with the organisation and contractors' staff and managers were much more inclined to disseminate project-related information. The main factors for their participation were a duty of care to deliver better social products to the public and improve the project management profession's integrity. Contractors were eager to correct the negative public perception narrative that inadequate management practices that influence construction scope and budget are primarily due to the contractors' actions. These responses can create limitations in the data analysis process due to the variety of psychological biases. The research team explained how such biases could affect the research outcome and the respondents acknowledged these explanations.

Transaction-related costs were not considered due to the unavailability of clean representative data. These include costs associated with the preparation of bidding documents, contractual and legal formation, administering the contract from the in-house project and construction departments, statutory applications and time spent following up on approval status. Other project costs excluded are capital contribution costs paid to two other state agencies responsible for electricity and water supplies.

5. Findings

5.1. Performance of the 2005/2010 Social Housing Programme

An overview of the 2005–2010 Design-Build programme yielded 6243 units of social housing at a final cost of approximately \$5,191,522,000.00 TTD (Trinidad and Tobago dollars, \$1 USD = \$6.83 TTD) at an average cost of \$831,575.00 TTD per unit. All projects within the programme suffered cost overruns, averaging 75% above the contract award sums. In total, 100% of the design-build projects had cost overruns with a median of 87% (mean 94%) above the accepted contract sum. One project exceeded its contracted budget by over 200%, four projects overran cost estimates by over 150%, three projects overran cost estimates by over 100%, four projects exceeded 70% contracted costs and four projects exceeded 40% of the contracted costs. Three projects did not exceed its contracted cost by more than 40%. Fifteen of the 19 projects that commenced in the 2005–2010 political cycle remained incomplete, and management of this programme, together with the new housing programme by the incumbent government in 2010–2015, constrained cash flow

and resources to continue the new government policy of a similar programme of equivalent magnitude. Table 1 shows the performance of infrastructural projects during the 2005/2010 programme cycle.

Table 1. 2005–2010 Design-Build Programme Performance (in Trinidad and Tobago Dollars, currency code TTD).

Project	Contract Award/ Completion Date	Original Contract Sum (TTD)	Price Variation (TTD)	Cost Overrun (%)
1	July 2005/ July 2012	163,394,697.12	116,186,634.22	71%
2	July 2005/ July 2013	57,484,766.09	87,722,785.23	153%
3	Jul 2005/ Oct 2011	133,129,000.00	54,707,606.84	41%
4	Oct 2007/ Oct 2011	88,660,471.91	13,380,664.79	15%
5	Feb 2005/ Feb 2013	290,506,855.14	322,953,166.80	111%
6	Dec 2007/Dec 2012	65,110,289.00	24,886,100.80	38%
7	Oct 2007/ Oct 2012	27,433,576.45	26,072,749.75	95%
8	April 2006/ present	85,448,540.82	174,569,708.09	204%
9	Dec 2005/ June 2015	298,944,490.50	379,577,411.70	127%
10	Jul 2004/ Oct 2013	366,085,547.83	153,781,415.29	42%
11	Jan 06/ Nov 2015	51,669,306.54	75,026,601.64	148%
12	Sept 2005/ Oct 2013	76,558,282.30	7,768,970.88	165%
13	Dec 2004/ Dec 2011	66,434,777.80	44,274,141.41	67%
14	Oct 2003/Ongoing	313,448,071.21	31,523,666.83	11%
15	March 07/ June 2015	277,697,724.00	339,735,129.56	122%
16	Jan 2007/ 2009	23,902,129.00	17,764,374.21	74%
17	Jan 2007/ May 2013	382,636,740.07	125,959,613.22	43%
18	Nov 2005/ Jan 2012	96,585,870.98	84,367,604.19	87%
19	March 2005/ Dec 2013	71,061,239.00	115,569,014.53	163%

From the distilled 2005/2010 data, all the projects exceeding 100% cost overruns had four commonalities:

1. The decision to build by the Board of Directors was made without any details of infrastructure and planning permission. Only the conceptual layouts of the housing sites were provided, together with a high-level estimated cost to construct.
2. Construction of housing commenced without infrastructure and utility connectivity and completeness of scope and design. Thousands of housing units reached substantial completion without being allocated to any beneficiaries in 2010. Subsequently, infrastructure had to be re-designed according to the new housing plans, elevations and other as-built technicalities. Two housing developments located in the east of the country, chosen as a political strategy, were currently severely affected by flooding during heavy rainfall. The decision to build homes was undertaken without proper

elevation requirements, even though these areas were known to be flood-prone areas [36]. The Drainage Authority refused approval, as both developments breached the prescribed setbacks from the main natural watercourses and where the ground-water table is extremely high. These technical data were available before construction, but were not given due consideration.

3. Numerous scope changes occurred during the construction phase of the housing developments. These changes were strategic, as politicians utilised the initial incomplete estimates as a tool to demonstrate their parties' effectiveness in building at a more affordable cost in comparison to their political rivals. The ad hoc and unstructured decision-making process on projects created further complications within the organisation reporting structure. Such non-compliance and incongruity with organisational processes resulted in delays and cost overruns.
4. Seven project actors (two senior client project managers, two project officers, one senior quantity surveyor and two contractor project managers) indicated that the project environment was "politically charged" and detrimental for career growth and overall well-being. Discussions with three senior project actors corroborated that decisions were made by the political directorate and executives, together with contractors, to effect changes to the project scope without their involvement. They became aware when the works were in progress and approval documents were to be later formalised.

5.2. Performance of the 2010/2015 Social Housing Programme

Following the formation of a new Board of Directors in 2010, a decision was made to re-evaluate the housing programme delivery model and to audit financial performances of existing projects. The consensus was to review and investigate failures within the existing social housing programme before commencing a new programme initiative. A review period of three months was initially approved by the organisation to study project performances and to develop a new approach that could be easily adopted by the programme management team. This review period was extended by a further three months when an interim assessment report was presented to the Board. Overall, the review period took 10 months to assemble data and conduct performance reviews on existing project teams.

The 2010–2015 Design-Build programme yielded 3391 additional social housing units at a final cost of approximately \$3,585,500,757.11 TTD at an average cost of \$1,057,358.00 TTD per unit. In contrast to the 2005–2010 programme, cost overruns ranged from a minimum of –32% to a maximum of 11% above the contract award sums. In total, 50% of the projects overran accepted contract amounts with a median overrun of approximately 1% (mean –5%). Of the seven design-build projects, four projects were completed within or under budget, with overall cost overruns averaging 3.7%. One project was completed under the contracted budget by over 32%, due to a termination of one contractor for under-scoping foundation works. Three projects did not exceed its contracted cost by any more than 11%. Fifteen of the 16 existing projects commenced in the 2005–2010 political cycle were also completed in this programme cycle. Table 2 displays the social housing programme performance results for 2010–2015 while completing the 2005/2010 programme.

Table 2. 2010–2015 Design-Build Programme Performance (in Trinidad and Tobago Dollars, currency code TTD).

Project #	Contract Award/ Completion Date	Original Contract Sum (TTD)	Price Variation (TTD)	Cost Overrun (%)
1	April 2012/ March 2015	1,236,704,755.27	130,598,232.88	11%
2	Aug-11/ Feb 2015	545,337,160.88	104,848,117.79	−19%
3	Mar-14/ March 2017	31,992,302.00	1,438,584.00	4%
4	April 2012/ July 2015	713,153,487.09	81,717,815.09	11%
5	May 2012/ Dec 2014	65,252,980.39	1,471,963.54	−2%
6	April 2014	346,532,669.65	109,840,880.00	−32%

Interviews with nine project members (four client representatives and five contractor representatives) on the marked improvement in cost overruns yielded the following findings:

1. The project management office was restructured into three departments: Project Oversight, Construction Management and Contract Management. Separate functions were attributed to each department to promote transparency in the current organisation processes.
2. Though perceived political influence permeated the project oversight office, it was stopped by the Construction Management and Contracts department.
3. Independent reviews were conducted on all designs before the commencement of construction.
4. The Construction department conducted learning lessons meetings to understand previous cost overruns on the existing programme and the latest research proposed to curb delays and cost overruns.
5. Variations on projects followed a stricter process. Both senior project manager and project manager reviewed all proposed variations. If variations were valid, then associated costs were assessed by the quantity surveying team and approved by the senior quantity surveyor. A variation report was prepared to the departmental head, authorised by the project manager and senior project manager. Further advice and approval were then sought from the Project Oversight and Contract Management Departments. This internal process was mandatory before final confirmation by the board of directors. The approval process for variations was estimated to take four weeks.
6. All bespoke contracts were stopped, and the FIDIC (International Federation of Consulting Engineers) standard form of contracts was implemented on all projects.
7. Cost overruns on two projects were political in nature. A decision was made by the Board of Directors to increase the level of finishes being supplied under the contract for housing (installing planters along driveways, higher grade tiling to units and cabinetry in both kitchens and bedrooms). These variations were subsequently reviewed through the approval process discussed in (5) above.

5.3. Comparison of the 2005/2010 and 2010/2015 Social Housing Programmes

A comparison between the two successive programme performances under different political cycles, with different political regimes, were ranked and plotted against three categories: technical root causes, transitional causes and perceived political root causes. Transitional causes are due to both techno-political issues and external environmental events (such as labour strikes and flooding). The resulting graphs and its associated trendlines are shown in Figure 3.

1. The following findings were derived from a comparison of the three groupings of root causes and the associated reasons for cost overruns per project:
2. The overall percentage cost overruns on projects due to technical influences were significantly smaller than the overall cost overrun percentage due to political influences.
3. Technical influences for cost overruns followed a linear trajectory.
4. Political influences on cost overruns followed an exponential trajectory.
5. The more politically charged the project environment, the steeper the cost overrun growth.
6. A transition zone, or the area where the linear technical influences transitions into the non-linear political influences and overlaps with other influences (economic, cultural etc.), accounted for cost overruns ranging from the lower limit of 15% to an upper limit of approximately 35%.

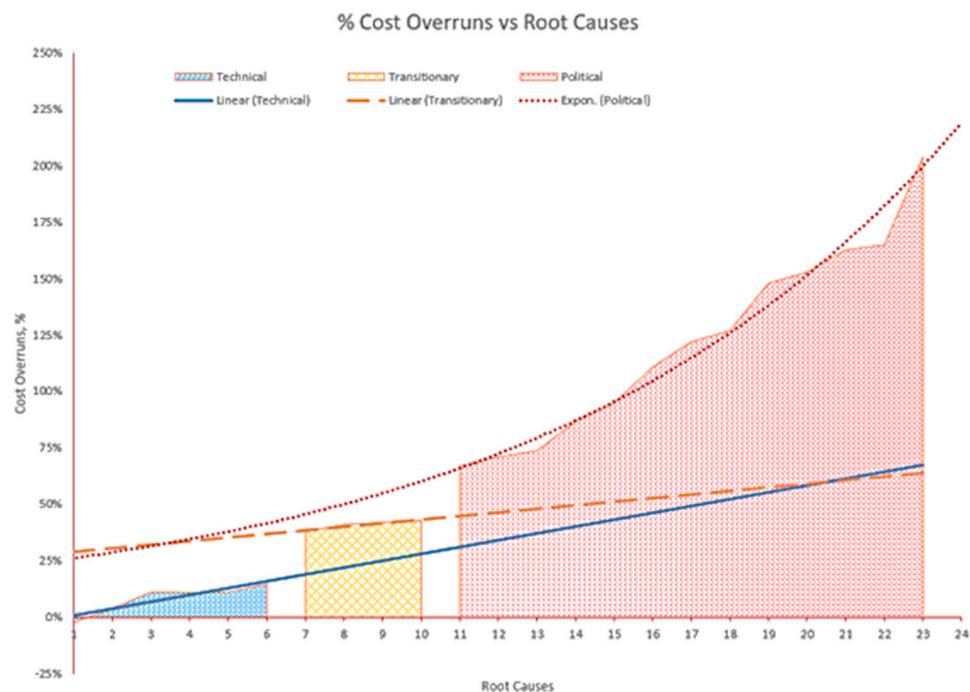


Figure 3. Comparing cost overruns associated with technical and political root causes.

6. Discussion

The findings and analysis of the cost performance data presented in the tables, together with the manner and process of decision making within the organisation, were reviewed to determine the validity of the systemic root causes of cost inaccuracies. Key concepts such as power relations, management reporting and learning among the programme actors were examined to determine their influence on the manner and process of decision making, which ultimately had a causal effect on cost overruns.

6.1. Decision Making at the State Organisation Level

The control of power relations, through perceived political influences, was found to be the main driver affecting the dissemination and implementation of better decisions on construction projects. Operationally, to achieve the vision of faster delivery of social housing projects, bureaucratic processes were perceived as lengthy, unnecessary and stymied ongoing works and overall project progress. Consequently, decision making for project scope changes and associated costs did not emanate from the project teams but the executive team. This practice was justified in line with international practices of separating operation matters viewed as a low priority in the organisation's structure for the Board's decision-making. Albeit formal processes, the organisation's improvisatory manner of decisions' formulation and dissemination in 2005/2010 added little value in improving

reporting efficiencies and reducing bureaucratic approval hurdles. The results showed a contrary manifestation of the “fast-tracking” project decisions and ignoring organisational processes. Project cost growth moved from a controllable linear path to an uncontrollable exponential path when approved processes were breached (Figure 3).

The delegation of responsibility to the external consultants, with selected favoured project managers, did little to improve infrastructure projects’ cost performance. There were no realisable value-added benefits gained on the projects by these experts. The approval processes adopted by the external consultants varied from project to project, creating ambiguities and further delays. Contractual agreements were not validated against the organisation’s established procedures. The delegated ad hoc nature of the decision-making process created tensions, uncertainties and unnecessary complexities within the project team on the compliance of processes during the project’s execution. These uncertainties materialised into the removal of innovative efforts and advocated self-perseveration behaviours. The effect being the evolution of a “blame and finger-pointing” culture.

Consequently, several project managers erred on the side of caution while disseminating routine instructions to selected preferred contractors. Their responsibility on the project became ambiguous as they were unsure what instructions project managers could issue and how these instructions should be issued. Thus, variations in project scope and costs were left mainly to external project consultants who became empowered to approve millions of dollars in variations without any internal project and executive team “visible” approvals [37].

Power and influence quickly tilted in the managing director’s (MD) favour. The effect of increased power and influence led to an imbalance of authority within the executive management and the Board, resulting in the chairman’s authority being usurped by the MD. Variations were approved on the advice of the MD and subsequently left for ratification by the Board. In the absence of formal ratifications of these decisions, payments were made to contractors exceeding the original amount.

6.2. Consequences of Decisions Making on Preferred Contractors

The dysfunctional nature of the decision-making processes provided a mechanism for several contractors to maximise self-interest agendas and profit from deficient organisation’s processes. Flawed processes of approving variation work evolved as the accepted de facto process, as the Board’s approved decisions were viewed as time-consuming and were not incorporated within any terms in construction Design-Build contracts. Minimal compliance with the process of issuance of notices and remedies as set out in contracts were observed by these preferred contractors. Threats of work stoppages became a reality when their requests for variations and scope changes were scrutinised or rejected. Selected projects were subsequently left on “auto-pilot” and several senior project managers stated that decision-making authority was removed from the responsible team. The political directorate decided on contractor selections and payments, and authorised change requests for subsequent approval. Formal change requests were infrequently disseminated on time, and as a result of these added complexities, the project team lost control of the social housing programme and associated projects’ scope, schedule and costs.

6.3. Consequences of Decision Making on Project Professionals

Two notable observations of inefficient decision making that led to cost overruns were the high attrition rate of qualified project professionals and the erosion of the cohesiveness of the project teams’ culture within the programme.

6.3.1. The Attrition Rate of Competent Project Professionals

Several senior project managers refused to comply with the new norm of the organisation. To bypass these teams’ scrutiny, junior project managers were empowered with more authority than their assigned senior project manager. As a consequence of this power

dynamic, “shadow project teams” effectively executed decisions on selected projects. Unfortunately, this resulted in a high attrition rate of project managers within the programme. It was also observed that the project managers who resigned were all civil engineering graduates, both at undergraduate and postgraduate levels. Other professionals chose to complete their two-year employment contracts and close their contractual relationship with the organisation. Senior project managers, who had resigned because of the strategic political influences’ pervasiveness, stated that working in a politically-charged environment was detrimental to their professional career and development and significantly impacted their mental health and well-being.

This high attrition of competent project managers created vacancies within the organisation. These job positions were eventually filled by other staff members of lower academic qualifications, credibility and experience. An unaccredited certificate in construction management, maintenance or project management became acceptable criteria for selection as a project manager, a position responsible for the management and oversight of hundreds of millions of dollars. As a result, perceived political influences dictated the selection of project managers. The partisan dynamics led to clerk of works being promoted to project managers. Approving works based on executive decisions and not project requirements and empowering contractors with more control (by either reducing the reporting of performance metrics and quality compliance violations) are two main outcomes resulting from the above political interferences.

6.3.2. Implications of the Project Team’s Culture

Conflicts capable of changing project teams’ cohesive culture manifest in politically charged environments, both from within and external to the project. Several team members adopted a hands-off approach, possibly in an attempt not to offend some executives or to preserve their employment. Several cliques emerged within the social programme with varying loyalties to the MD, Chairman and Minister. For example, for projects which exceed 100% cost overruns, the client placed more trust, control and authority on those projects to preferred contractors. This behaviour resulted from perceived relationships with the political directorate and the Board or promoted “scaled-up” project managers (lacking the competency to control the project) managing the project’s daily demands.

During the 2005/2010 housing programme, political influences seemed to create a dysfunctional project environment, resulting in the obscurity of governance and reporting lines of authority. This was also exemplified by the MD’s dual roles in which the MD also acted in the Executive Chairman’s capacity, authorising change orders or variations to be later ratified in subsequent board meetings. The duality of roles directly contravenes the amended housing legislation under the Trinidad and Tobago Housing Act [35]. This behaviour was only corrected when political questions on the perceived strategic relationship between the Housing Minister and the MD arose in parliament. Consequently, the Housing Minister and the MD were fired on allegations of mismanagement of public funds [38] and a new minister was tasked with reviewing the practices in the organisation.

6.4. Understanding Political Influences in Infrastructure Project Delays

The 2010–2015 programme’s performance (Table 2) displayed a marked improvement compared to the 2005/2010 programme. Though 93% of the 2005/2010 Design-Build programme overlapped with the new political cycle and its new programme, a renewed management team were eager to resolve this challenge. A new framework was introduced based on the theoretical works mainly from Flyvbjerg [7], Cantarelli, Flyvbjerg, van Wee and Molin [17], Love, Davis, Baccharini, Wilson and Lopez [21], Morris and Geraldini [22], Flyvbjerg [24], Flyvbjerg, Bruzelius and Rothengatter [29], Love, Davis, Baccharini, Wilson and Lopez [39], Love [40], Flyvbjerg [41], Cantarelli [42] and Söderlund [43]. Managing projects evolved to reframing the teams’ mindset from project management to the management of projects. This framework was built on the knowledge and experiences obtained from the

existing projects' actual performances and the divergence towards processes tailored to the Design-Build projects' size and complexity.

The knowledge gathered showed executive decision-making issues, uncertainty in scope changes, the validity of instructions, self-perseveration tendencies and agent pre-occupations are all pathogens [39] acting as a catalyst for cost growth. Therefore, it was necessary to curb the power of politics from the team to ensure focus was kept on the projects. Based on the analysis of cost overruns on these programmes, the main factors that can either curb or promote political influences, mainly strategic misrepresentation, are summarised in Figure 4.

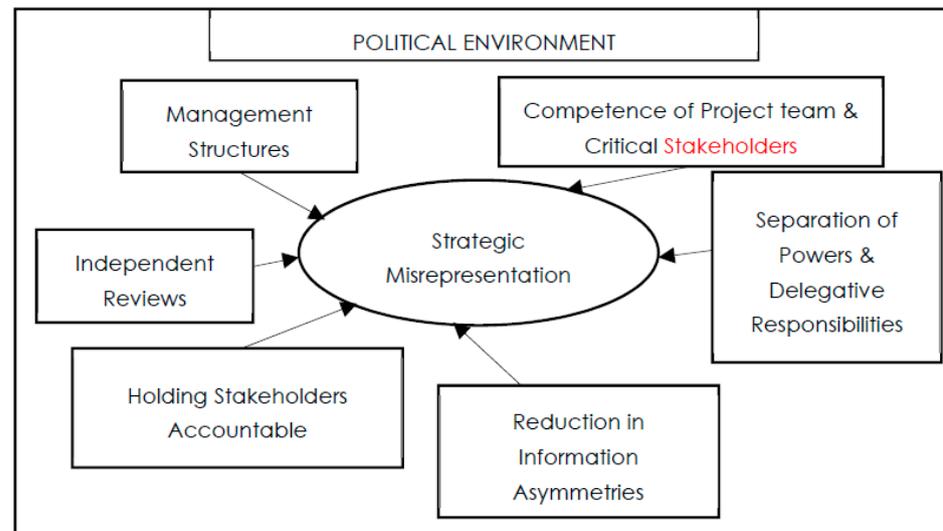


Figure 4. Main factors to limit cost overruns due to political influences.

From the existing programme data, a cost overrun (growth) curve was plotted (Figure 5). The dominant explanations and root causes of cost overruns were grouped and mapped to its corresponding percentage of the cost growth curve in public housing social programmes. Two transitional zones and boundaries were created to explain the cost growth transitioning from the initial linear segment of the curve to an exponential segment.

Cost overruns based on technical influences followed a linear and elastic relationship (Figure 5). If variable y represents the cost overruns, the intercept established a budgeted contingency amount in a contract, typically 10%. The elastic relationship correlates to cost overruns that can be controlled and reversed once technical factors are reviewed and accounted. Psychological factors, such as optimism bias, and HSE factors can also be accounted for under the linear and elastic portion of the cost growth curve.

This study showed that strategic misrepresentation strongly influences daily practices and culture. From the PSSHP's performance, cost overruns based on political influences followed an exponential curve growth. In mitigating exponential cost overrun growth, a proposed protectionary mediating mechanism can be created to act as an invisible barrier of influence between the project team members and the political directorate. A barrier (for example in the form of a highly trained and ethical project professional) insulates the programme's executing team from being influenced by external judgement calls from unaccountable officials. The technical professionals can administer social programmes without the need of cherry-picking data to please executives. It is shown from the 2010/2015 programme performance, without technical data manipulation to support political influences, inefficient decisions would not permeate throughout the programme, leading to cost overruns. Consequently, political influences are curtailed to only the initiation phase of the programme.

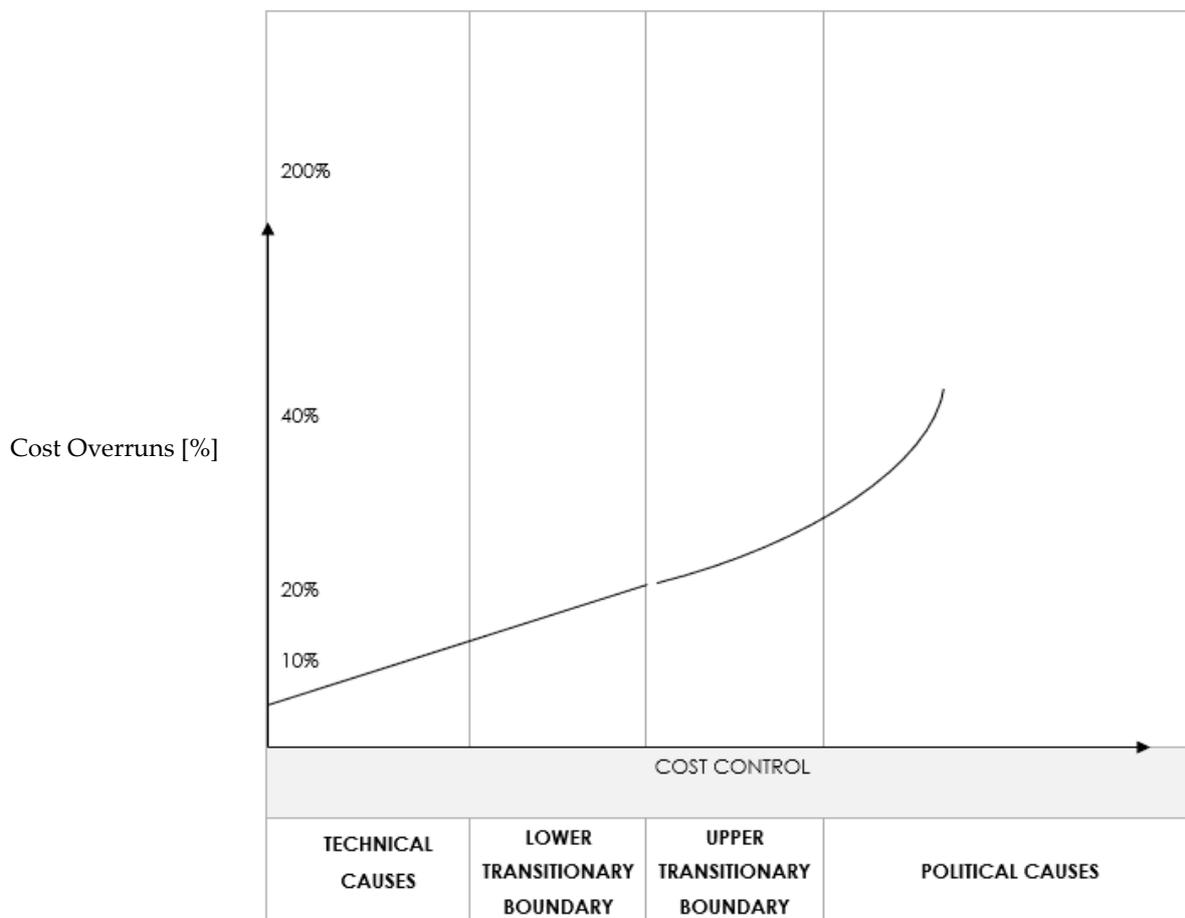


Figure 5. Transition visualisation for cost overrun management.

Given the estimation process' probabilistic nature, a cost overrun intercept exists and can be negated or reversed by prudent technical management and oversight. However, we observed that programme management's mismanagement of controllable risk factors resulted in uncontrollable cost overruns, with one project in the programme exceeding 200% of its contract award sum. Technical complexity cannot be the basis for such cost overruns. Innovations in material selection, technology and processes are well known and have been established for decades. Still, these technological advancements are unable to limit cost overrun growth. This severe cost growth is promulgated when technical professionals buy into partisan politics, focusing on the political regimes' interest rather than wider societal interests and project benefits.

7. Conclusions and Outlook

Through an exploratory case study of cost performances in public housing programmes over the first decade of the housing agency's operation, we were able to draw comparisons with Flyvbjerg [24] constructs of optimism and strategic misrepresentation (deceptive) practices in the execution of these projects. It was observed in the 2005–2010 programme that several key project actors strategically altered key performance indicators to gain project acceptance. Such strategic actions resulted in misallocation and misappropriation of state resources and led to sub-optimal projects. The key findings during this programme period varied from those of the developed nations and are as follows:

1. Unstructured and ad hoc decisions made without following formal planning and technical guidance.
2. Numerous scope changes on projects guided by political will.

3. Politically charged project environments led to less cohesive team dynamics and culture, resulting in sub-optimal productivity and higher attrition rates among professional staff.

Therefore, for structures with poorly enforced governance, accountability and decision-making systems, biases such as optimism, together with strategic misrepresentation, are systematically and systemically present. Delusive and deceptive behaviours are systematically pervasive when unsound political influences, through power-centric autocratic leaders, dominated the decision-making discourse. The cultural norms consequently adapted to this ineffective environment to systemically permeate inefficient practices throughout the organisation. Professionals and technically driven project teams often become entrapped in this phenomenon, an organisation culture of cost overruns, which may frustrate project management practice. The technical team contributed to the cost overrun phenomenon with the acceptance or delusion of inefficient organisation culture concurrently with compliance to the politically motivated directives.

However, a considerably better programme performance was observed during the 2010–2015 period. A marked reduction in cost overruns was recognised in the new programme. Improvements in management structures, project managers and critical stakeholders' competence, separation of powers and delegative responsibility, reducing information asymmetries, holding stakeholder accountable and independent reviews on the scope and designs were the main solutions attributed to better performances. These strategic changes led to better cost estimates. These improved practices were in line with Love and Ahiaga-Dagbui [9], who debated that errors, omissions and project-related pathogens influenced the main drivers of cost overruns.

Mainstream project management based on empirical evidence science is limited when attempting to explain the cost creep in social housing programmes. An analysis of the case study suggested that the prevalence of cost overruns in social housing projects was mainly due to politically motivated interests, which adversely affected the PSSHP's performance. The intended benefits derived from the 2005/2010 public housing programme have not been realised, as the median cost overrun was averaging 87% more than the contract award sum in the 2005–2010 housing programme. Partisan decision-makers and influencers have fallen short in executing the overall programme's vision of delivering a properly planned, valued engineered, low-income housing to improve the standard of living and self-development of the nation's citizenry. Without structured enforcement of any regulations or policies concerning public funds' mismanagement, these projects will continue to suffer from strategic mismanagement. Cost growth above and beyond the contracted sums have become a cultural norm. The result compares and aligns with worldwide findings on major programmes on the unwanted culture of delays and cost overruns. These findings reinforced Flyvbjerg, Garbuio and Lovallo's [16] view of "survival of the unfittest"; the ever-increasing popularity of major programmes despite their dismal performance records, with deception and delusion as the root causes of cost overruns, also holds for public sector housing programmes in SIDS.

From this SIDS' case study, cost overruns changed in varying political cycles, and greater cost overruns were associated with PSSH projects where political influences dominated technical influences. Additionally, political influences account for larger cost overruns and ineffective decision making and span of control as compared to technical influences. We endorse the need for a mechanism to control the political influences permeating within PSSHPs.

8. Future Research

The systemic issues originating from political influences affect the management of PSSHPs and directly correlate with sub-optimal construction management decisions and practices. The result is cost overruns, measured as a project's accepted contractual sum greater than the actual cost to complete the project. Further research is required to understand how pervasive this phenomenon is within the construction sector of SIDS. This

phenomenon can be investigated utilising case studies of different construction projects, such as schools and wastewater treatment plants. This phenomenon's generalisation into theory can be undertaken through quantitative research, such as using fuzzy synthetic evaluation (FSE), to assess the importance of decision-making criteria. This type of modelling allows a researcher to gain deeper insights into the project actors' perceptions of the various cost overruns root causes and determine the critical factors and overall risk groups for mitigation. Finally, a closer look at the theoretical concepts and their associated epistemologies is warranted to determine whether the subjective and ad hoc implementation of these theories by project actors adds to uncertainty in decision-making and the manifestation as cost overruns.

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