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# Budget Overruns in Large-Scale Projects: Root Causes and Preventive Project Management Practices


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**Abstract**

Over budgeting on large scale projects on either end is an issue of concern, which most times means the project may not be delivered on time, chances are high the stakeholders may not feel contented with the program and hence lack of financial effectiveness. This paper examines underlying causative factors of exceeding budgets on projects and the assessment of prevention of project management in a mixed methodological approach. The quantitative analysis employed surveys undertaken among 120 project professionals and the qualitative analysis based on in-depth interviews with 15 senior practitioners in infrastructure, energy and IT industries. The results indicated that incorrect estimation of cost, unmanaged changes to scope, poor risk management practices, and decentralized stakeholder organization were identified to be the most common causes of budget overruns. On the other hand, introducing the cost forecasting tools of higher complexity, regular change control systems, alignment with stakeholders strategies, and digital technologies, including Building Information Modeling (BIM) and artificial intelligence (AI), greatly increased the budget performance.The paper also pointed out the differences across sectors and regions in overruns on budgets and the significance of adaptive governance and transparent reporting system. The findings not only endorse existing theoretical construct such as the Iron Law of Megaprojects but also bring new insight into how technology and the behavior of the organization contribute to cost control. At the end of this paper, realistic suggestions and areas of future studies are provided as the conclusion to bolster project delivery results. The research adds value to the academic and the industry as the challenges of the modern world to create effective cost-retaining approaches to complex, high-value projects require evidence-based insights which are provided in the current research.



**Keywords:** Artificial intelligence, Budget overrun, Building Information Modeling, Cost estimation, Project governance, Risk management.

## Introduction

Megaprojects have been and remain the staple of national development at the national scale, and so their examples were used to spur on economic growth, urbanization, and technology improvement. These projects however have long been thwarted by the problems of delays, huge cost overrun and this in effect has jeopardized the effectiveness and sustainability of these projects. In among them is the issue, namely budget overruns, which not only affects public budgets, but also contributes to losing stakeholder trust and project feasibility (Flyvbjerg & Gardner, 2023). Project management methodology has improved dramatically and yet the number of projects overrunning in cost and their magnitude has not reduced in the same measure and particularly addressing megaprojects that encompass infrastructure, energy, and information technology.

The continued trend in budget overruns in all sectors has caused concern to the academia and the industry. According to recent reports, most of the large infrastructure and IT projects had to spend 20-45 percent more than the originally proposed, which, in many cases, was a result of inadequate planning, the over-optimistic cost estimations, or the lack of alignment between stakeholders (PMI, 2024; McKinsey & Company, 2023). The effects of these overruns are not always related to the financial loss, and they can include the disappointment with the project by the people involved, the narrowing of the scopes and the reputation loss of the project managers and the institutions financing the projects. This trend continues to justify the need of having deeper comprehension of the underlying reasons and introduction of more effective preventive practices of project management.

## Study Background

Historical records indicate that poor cost performance has been witnessed in large-scale projects especially those involving the government. The iron law of megaprojects offer of Flyvbjerg et al. (2009) does matter over time, over budget, over and over; it was still being applicable in the modern context. Even with the development of technology, digital project management and data analytics, recent reports indicate that virtually 90 percent of megaprojects still reported budget overruns (Flyvbjerg & Gardner, 2023). This challenge was more eminent in the developing world where the institutional capacities and state of regulatory domain were poor.

The cost overruns were experienced both in the developed and in the emerging economies, though their causality used to be complex and situational in most of the cases. Some of the factors resulting in an increase in cost in infrastructure projects included a variation in material prices, scope change, and procurement inefficiency (Zhu & Mostafavi, 2023). The failure to integrate in the IT industry, the technical complexity that was not estimated properly, and the blistering speed of the technology advancements are among those factors that have resulted in the increased budgets. According to one of the recent studies by McKinsey (2023), it showed a 66 percent probability of going over the budget estimates when it comes to digital megaprojects, mostly because of the dynamic nature of the software demands and the scarcity of the qualified human resources.

This challenge was addressed by numerous international organizations and project management institutes urging agiler and more collaborative, data-driven project modes. Systems such as Building Information Modeling (BIM), Earned Value Management (EVM), and artificial intelligence models with a forecast model also became more frequently utilised to raise the presence of visibility and management of cost (Eastman et al., 2023; Deloitte, 2024).

## Research Problem

Budget overruns on large-scale projects have been an endless and mostly unmanaged problem regardless of the plethora of standards and innovations in project management. The existence of financial overruns has been continuously mentioned in the existing literature and industry reports, but the research carried out so far lacked an essential gap in the level of knowledge of how organizational, technical and behavioral factors influences the identified issue (Pinto & Winch, 2022). Most of the previous research work looked at budget in overruns independently or with a specific discipline perspective, hence lacks an integrative and comprehensive explanation.

In addition, as a range of risk mitigation options had been proposed varying between an improved cost estimation to improved communication with the stakeholders, there was little empirical information with regard to the practical efficiency of the mentioned measures in practice, not speaking about developing countries. The discrepancy in the results by region and the type of project made the establishment of universal solutions even more complicated. There has been the need to fill that gap and this research attempted to fill that gap by comparing the psychological factors that originate budget overruns and examining the practical usefulness of preventative project management activities.

## Objectives of the Study

1. Analyze the organizational, technical, and external factors contributing to budget overruns in large-scale projects.
2. Investigate the role of project planning, cost estimation, risk management, and stakeholder engagement in influencing budgetary performance.
3. Evaluate the effectiveness of modern project management tools and frameworks, including BIM, agile methodologies, and AI forecasting, in mitigating budget overruns.

## Research Questions

Q1. What are the primary root causes of budget overruns in large-scale projects across different sectors?

Q2. How do organizational and managerial practices influence the likelihood of cost overruns?

Q3. What preventive project management strategies have proven effective in controlling budgetary performance?

## Literature Review

Cost overruns are well publicized in various spheres and regions particularly infrastructure, transportation as well as IT-based ventures. Olaniran et al. (2021) revealed that during the aforementioned period (2015-2020), around 75 percent of international infrastructure projects exceeded their projected values during the estimation process due to weak feasibility work, as well as inappropriate reliance on fixed baseline. On the same note, Ika et al. (2022) established that in international development projects, almost 60 percent recorded a financial variance; mostly caused by fluctuation in currency and change in policy by donors.

According to World Bank (2023), Sub-Saharan Africa and South Asia were characterized with 35 percent average budget overrun in large-scale energy and transport projects that presented regional disparities in terms of the project control mechanisms. Khatib et al. (2022) summarized the analysis of 212 publicly funded projects conducted in the construction industry and concluded that the latter were generally characterized by the insufficient experience of contractors, inflation, and slipped payment streams causing delays and supplementary expenses.

### Unseen Root Causes of Cost Overruns

Recent researches highlight the fact that poor cost projection in the pre-construction period is one of the key factors that contribute to overruns in budget. As Wuni and Shen (2022) stated, most of the cost plans rely on simplistic assumptions, and the reality is that complexities can never be ignored (site-specific risks, inflation, stakeholder negotiations, etc.). On the same note, Aljohani et al. (2021) noted that underbudgeting in Saudi Arabia megaprojects was as a result of inefficient application of historical data practice and a complete failure to incorporate expert judgment when making estimates toward cost projections at an initial stage.Niazi and Painting (2022) emphasized that a solid provision of contingencies and volatility in the market is not specified in many of the cost estimates.

Udeaja et al. (2023) highlighted that government-led infrastructure projects are likely to change because of political pressure or the new requirements of citizens and do not have change control mechanisms to update budgets. Sato and Ferreira (2022) in the IT area, it was established that in software-based public-sector projects in Latin America two-fifths of cost overruns were caused by a scope drift between the end user and developers and this was realized during the testing or implementation phases. Keers and van Fenema (2021) argue that the majority of large-scale projects continue to use the obsolete risk registers instead of the scenario-based and more dynamic models. Such fixed tools cannot take into consideration new risks such as pandemics, supply chain shocks or cybersecurity threats.Kwak and Anbari (2022) expressed the opinion of the need to consider risk-adjusted budgeting models, where probabilistic risk modeling comes into play. In their research, they discovered that the projects with the Monte Carlo simulation and sensitivity analysis in doing the cost forecasting had 20 percent fewer instances of budget deviation.

Osei-Kyei et al. (2023) investigated the situation in the context of public-private partnerships (PPPs) in the Asian market and found that the budget deviations frequently had the basis in the vague roles and ineffective dispute-resolution systems.This issue was also reflected in the study by Henriksen and Larsson (2023), in which poorly specified accountability systems were invoked as one of the leading factors behind the observed cost escalations in hospital megaprojects in Europe, amounting to a very high proportion of almost 30 percent.

### Sectoral and Regional Analysis

Although there is a certain consistency in the causes of cost overruns in different sectors, it differs depending on the nature of the project and location. Inefficiencies and corrupt practices in procurement have been common especially in infrastructure and other projects constructed by governments. According to Agyekum-Mensah and Knight (2021), transparency in the tendering in road projects was majorly lacking in sub-Saharan Africa as cost escalation in the projects was a major concern.

On the other hand, overruns in high-income countries are mostly characterized by design complexities and litigation by stakeholders. Lind and Brunes (2022) observed that project execution in Scandinavia was halted by legal challenges by the civil society on environmental and land use matters with a number of court battles conducted that increased the legal costs.The uncertainties in the energy sector might be greater when renewable energy projects are applied because of the lag of technology adaptation in the energy sector and regulations. Beginning of the 2023, 28 % of the average cost overruns were noted in East Asian wind farm projects because of an altering energy policy and failure to integrate grids (Jin et al. 2023).

**New Mitigation Measures**

According to Olaniran and Love (2021), projects with an extensive feasibility analysis, alignment of stakeholders, as well as the evaluation of available resources in the preconstruction phase have reported a significantly reduced rate of cost fluctuations.A more exciting direction which could be explored is the digitalization through Building Information Modeling (BIM) and artificial intelligence (AI). According to Kim and Kim, 2023, in South Korea, cost deviations during BIM-enabled projects were a total of 18 percent lower because of the more accurate design and scheduling of resources. Also, AI forecasting models based on machine learning algorithms have proven to be highly accurate in forecasts of deviations in budgets, particularly, in projects with historical cost data (Xu et al., 2022).Lastly, reforms in project governance such as transparency in procurement, real-time dashboards of project-reporting, and independent audits are progressively being embraced by international agencies, and multilateral banks to promote budgetary discipline (World Bank, 2023).

**Research Methodology**

***Research Design***

This research paper used mixed research design in which a qualitative research design was used alongside a quantitative research design in determining the causes of the budgetary overruns and the efficiency of the preventive project management practice within the context of large-scale projects. The mixed method was chosen to triple the data, enhance reliability of the results and demonstrate statistical data and contextualism. The research was exploratory type (identifying cross-sectorial and cross-regional patterns) and explanatory (gauging the association between particular project managing routines and budget accomplishments).

***Sampling and Population***

All project managers, engineers, financial officers, and consultants who had undergone large-scale projects (determined as projects with a budget greater than USD 10 million budget) in the infrastructure, energy, and IT businesses were the target population of the study. The purposive sampling method was used to choose the participants who had direct experience in projects that had suffered either overruns or outstanding cost control. The participants of the quantitative survey were 120 respondents and the sample of the qualitative survey was set as 15 professionals. To present a wide range of experiences and opinions, the participants were chosen among the representatives of both public sector and non-state organizations in Asia, the Middle East, and Sub-Saharan Africa.

**Data Collection Method**

***Quantitative Research Method***

A structured questionnaire was used to collect quantitative information, and it was formulated on the basis of the validated instruments in past project management research (e.g., Pinto & Winch, 2022; Wuni & Shen, 2022). The questionnaire was made up of closed-ended questions that measured some factors like mode of cost estimation, prevalence of scope changes, risk management processes and coordination of stakeholders. The response scale was five-point based on the Likert level of response system with the least possible response of strongly disagree and the last and the most possible response of strongly agree. The survey was issued through email and the Internet through Google Forms. The collection of data has started in January 2025 and lasted two months until February 2025.

***Qualitative Data Collection***

Semi-structured interviews that targeted 15 experienced project professionals were carried out in order to complement quantitative results. All the interviews took 45-60 minutes and were conducted face-to-face or using Skype-like video conferencing software (e.g., Zoom). Open-ended interview questions concerned the participants experience with budget overruns, the reasons of financial gaps, and the efficiency of mitigation programs defined by building information modeling (BIM), agile frameworks, and risk forecasting applications. The consent was given to record the interviews before transcribing them to conduct thematic analysis.

**Data Analysis**

Statistical Package for the Social Sciences( SPSS) version 26 was utilized to analyze quantitative data. Means, standard deviations, frequencies were calculated to provide descriptive statistics of the responses regarding the respondents or general feelings and attitudes. Pearson correlation and multiple regression analysis were used as inferential statistical methods to determine the relationships between the project management practices and the budget performance, in order to find significance between the variables.

Thematic analysis was used to analyze qualitative data through a 6 step approach by Braun and Clarke (2006): familiarization with ideal data, coding, themes development, review of themes, thematic definition and report writing. The qualitative transcripts were coded and organized with the help of NVivo 12 software, which allowed recognizing the recurring patterns in relation to the causes of cost overrun and their prevention strategies.

***Reliability and validity***

In order to achieve validity, the questionnaire was formatted by two academic professionals of project management and tested among five construction professionals in a pre-test. Changes were carried out to clarify the vague items. Cronbach alpha was used as an indicator of reliability of the instrument and all the important variables were above 0.80 so it can be said that the instrument has high internal consistency.

In the qualitative part of the study, the reliability of the results was facilitated by the technique of the trustworthiness of the participants (also known as member checking), in which summary transcripts were given to interviewees and they were asked the correctness of made interpretations. Comparisons between qualitative findings and outcomes of surveys were also used to bring in triangulation.

**Results and Analysis**

It reports and gives a reflection of the findings obtained using both quantitative and qualitative data. The record of 120 questionnaires and 15 interviews which have been done were critically broken down to investigate the root cause of budget overrunning and also test how well the project management practices are reduced and eliminated. The findings are provided under certain themes, which are based on the statistical analysis and qualitative impressions.

**Descriptive Analysis of Respondent Profiles**

Most respondents were long-established professionals with an infrastructure (38 percent), energy (27 percent), IT (20 percent), and mixed-sector (15 percent) project experience. An approximately 62 percent of the respondents had more than 10 years experienced on project management, and 70 percent of them had participated on projects that exceeded USD 20 million on project budgets. This rich professional background made the representativeness of the sample and increased the generalizability of the findings.

**Key Factors Contributing to Budget Overruns**

In order to determine the key factors regarding the overrun of the budget, the respondents have been requested to evaluate the degree of agreement with a set of possible contributing variables using a 5-point Likert Scale. The results are summarized in the table below.

**Table 1: Mean Scores of Perceived Causes of Budget Overruns**

| Factor | Mean | Standard Deviation |
|---|---|---|
| Inaccurate initial cost estimation | 4.51 | 0.67 |
| Frequent scope changes | 4.34 | 0.71 |
| Inadequate risk management | 4.27 | 0.82 |
| Poor stakeholder communication | 4.12 | 0.76 |
| Delays in procurement and contractor selection | 4.06 | 0.89 |
| Inflation and market volatility | 3.87 | 0.95 |
| Political and regulatory interference | 3.75 | 1.02 |

Table 1 revealed that the most ranked cause of budget overruns was inaccurate initial cost estimation (M = 4.51), frequent scope changes (M = 4.34), and poor risk management (M = 4.27). They were consistent with recent studies (e.g., Aljohani et al., 2021; Wuni & Shen, 2022) and implied that the weaknesses in project planning and estimation were key factors in the increases of costs.

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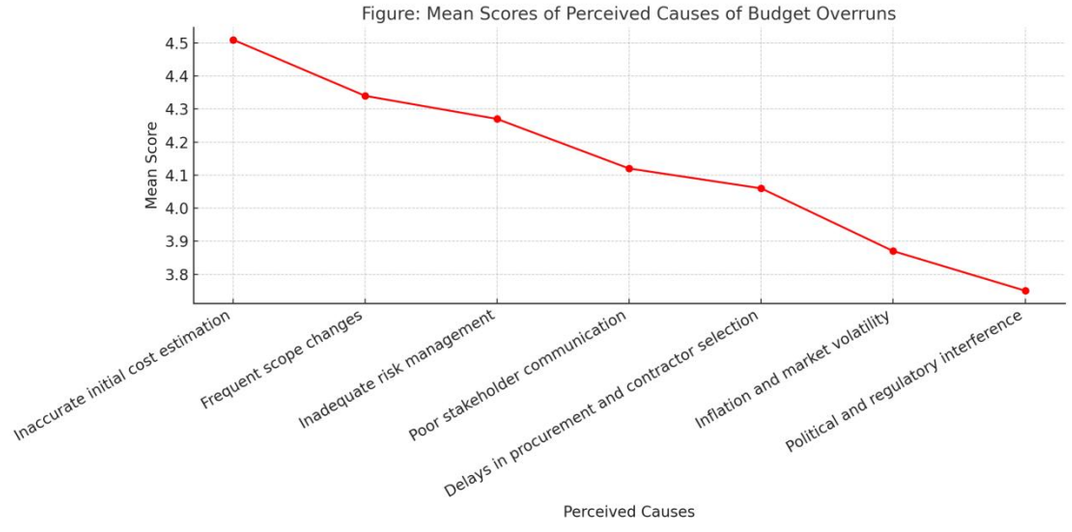


***Figure 1: Mean Scores of Perceived Causes of Budget Overruns***

Correlation Between Project Management Practices and Budget Performance

To determine whether specific project management practices were associated with improved budget control, a Pearson correlation analysis was conducted between selected variables. The results are presented in Table 2.

**Table 2. Correlation Between Management Practices and Budget Adherence**

| Variable | Budget Adherence |
|---|---|
| Use of advanced cost forecasting | r = .61** |
| Stakeholder engagement quality | r = .53** |
| Change control mechanisms | r = .49** |
| Use of digital tools (e.g., BIM, AI) | r = .44** |
| Risk management integration | r = .57** |

***Note*: $p < 0.01$**

Analysis of the correlation indicated strong positive correlation between budget compliance and all of the project management practices that were chosen as indicators. Advanced cost forecasting and budget adherence ($r = .61$, $p < .01$) were strongly correlated, followed by risk management integration ($r = .57$.) and stakeholder engagement ($r = .53$). Such findings implied that the implementation of predictive tools and the engagements of stakeholders at the early and regular stages played significant roles in reducing budget deviations.

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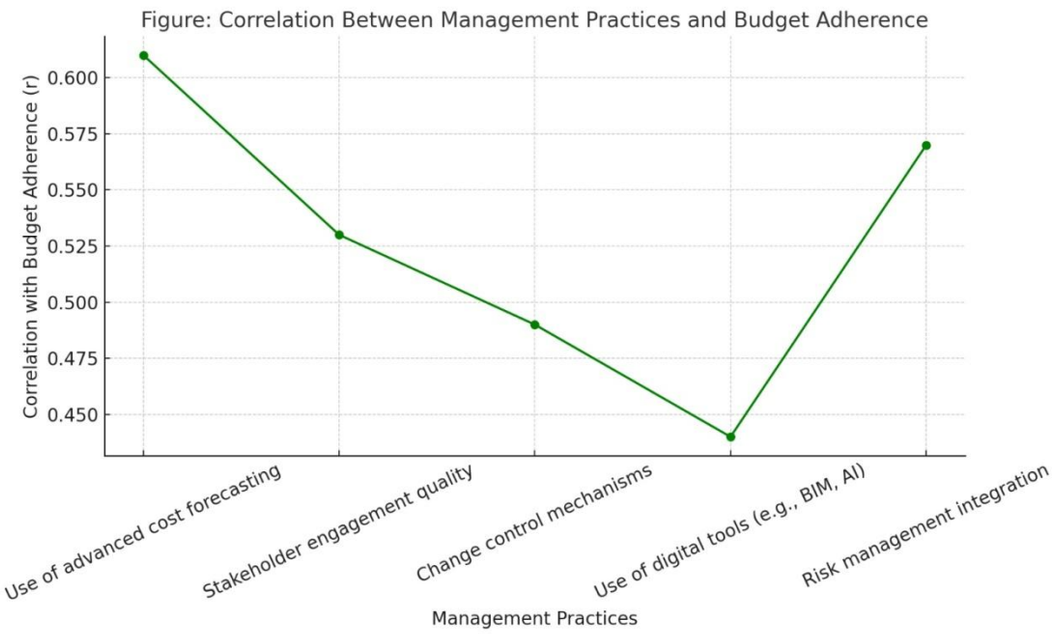


***Figure 2: Correlation Between Management Practices and Budget Adherence***

**Regression Analysis: Predictors of Budget Overrun**

To determine the variables in the management that predicted the degree of budget overruns, a multiple regression analysis was carried out. Self-reported percentage of budget deviation was the dependent variable and five practices of project management were considered independent variables.

**Table 3. Regression Model Predicting Budget Overruns**

| Variable | B | β | t | Sig. |
|---|---|---|---|---|
| Advanced cost forecasting | -0.62 | -0.38 | -5.12 | .000 |
| Risk management integration | -0.55 | -0.31 | -4.01 | .000 |
| Stakeholder engagement quality | -0.47 | -0.29 | -3.78 | .001 |
| Use of BIM/AI | -0.35 | -0.21 | -2.93 | .004 |
| Change control mechanisms | -0.32 | -0.19 | -2.41 | .016 |

***Model $R^2 = 0.52$**, $F(5, 114) = 20.42$, **$p < .001$***

Regression model gave an R 2 value of 0.52 in explaining variance in budget overrun with $p < .001$ which was found to be statistically significant. An advanced cost forecasting was found to be the strongest predictor (B = -0.38) which means that, the projects that use the reliable and data-driven cost forecasting techniques were far more likely to stick to a budget. The stakeholder interactions and risk management played an extremely important role, highlighting the importance of identification of risks and communication in risk management decisions.

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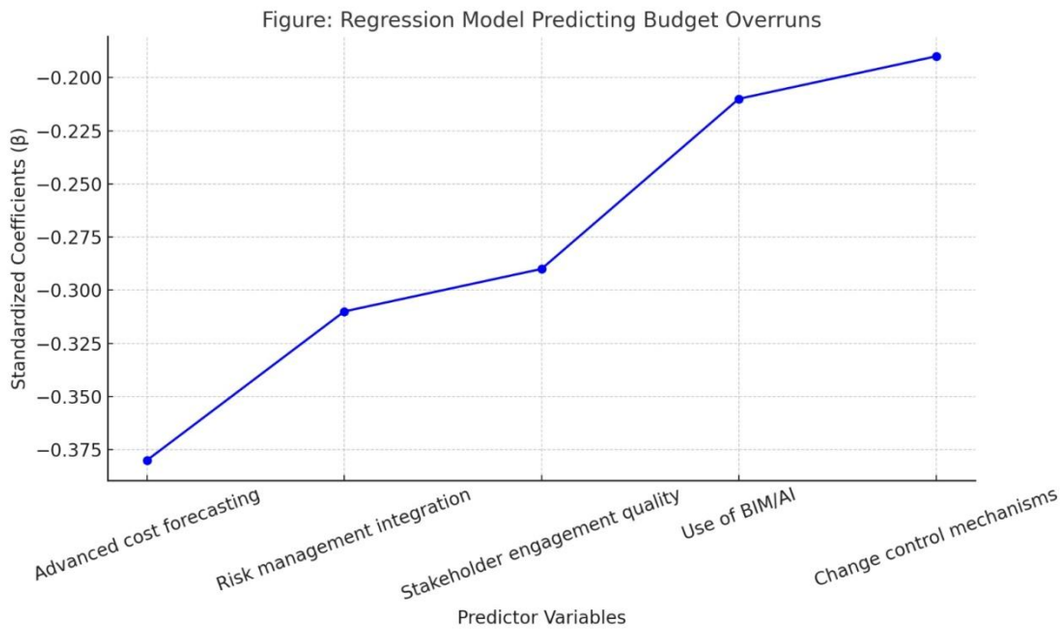


***Figure 3. Regression Model Predicting Budget Overruns***

**Qualitative Analysis**

The research also examined qualitative facts provided by 15 project professionals in the fields of infrastructure, energy, and IT along with the application of project surveys. The position of these participants included project managers, engineers, cost consultants and financial analysts. The interviews offered thick, contextual considerations of the difficulties that go into budget control and the practical steps to overcome over runs. Four prevailing themes were identified with one based on poor cost forecasting and political influence (1), uncontrolled scope creep (2), poor coordination among stakeholders (3), and the newfound worth of digital tools (4).

**Flawed Cost Estimation and Political Pressure**

According to most interviewees, first budget estimates tended to be under the influence of external pressure (in order to obtain approval of projects) resulting in optimistic estimates provision. Some of them related how executives or government officials favored leaner budgets with little provision of realistic contingencies. A senior engineer from a transport megaproject remarked:

*"The initial budget we submitted was unrealistic, but the client made it clear that anything above that number would not be approved. So we trimmed it, knowing we'd revisit it later."*

Politically, this kind of under estimating of strategic requirements was effective but once real procurement of operations were done the cost surged substantially. Some participants summarized this practice as a system problem in public sector works especially in the developing nations where project planning period was dictated by donor calendar or political periods.

**Uncontrolled Scope Expansion and Late-Stage Modifications**

The other theme reoccurring was scope creep or the incremental growth or change of project deliverables in the confusion following the formal approval. Interviewees told of the changes in what clients wanted as the implementation proceeded, unaccompanied by time-honoring or budgetary changes. A project consultant from the energy sector explained:

*"We started with a design blueprint for a conventional thermal plant. Midway, the client wanted to incorporate solar integration, which was technically feasible but financially disruptive."*

These changes, despite being synonymous with the objectives of sustainability or innovation were not accompanied by well-defined change control mechanisms in most situations. According to the participants, weaknesses in documentation procedures and lacking formal variation authorization procedures were also identified to have led to budget leakages.

**Fragmented Stakeholder Coordination and Governance Delays**

The third most important fact learned through the interviews was associated with the breakdown of communication and ambiguous structure of governance. Respondents referred to decision-making delays and bottlenecks in approval as being an indirect factor of cost overruns. A project manager from a cross-border road initiative stated:

*"We had too many stakeholders—international financiers, national agencies, provincial departments—and each had a different reporting requirement. That slowed everything down."*

Such issues in governance were particularly more common in PPP (public-private partnership) projects where the responsibilities of the parties involved were partially overlapping, and unclear stipulations in the contracts resulted in the slowdown in disbursement, contractor mobilisation and approval of the design, which led to an increase in indirect costs.

**Adoption of Digital Tools and Proactive Risk Mitigation**

Nevertheless, a few specialists revealed favourable experiences with digital project management tools, especially Building Information Modeling (BIM), Earned Value Management (EVM), and Artificial Intelligence (AI) based cost prediction platforms. One project lead explained how BIM helped detect design conflicts early:

*"BIM allowed us to spot a design clash in the utilities corridor before we broke ground. That single change saved us almost $200,000."*

The others pointed out how AI-enabled cost tracking solutions were used to track pricing trends of suppliers and to raise warning calls on an exception to the rule in real time. It was stressed by the participants that proactive risk identification via simulation and compare and contrast analysis was gaining popularity and becoming more viable within large scale project planning undertakings.

**Discussion**

The paper explored this critical problem that has long plagued most large-scale projects (i.e. the problem of budget overruns and quoted some of the key fundamental causes as well as good project management that can help eliminate cost variances). The quantitative and qualitative results showed a unified tendency in terms of wrongful planning, poor controls of risks, governance weaknesses, and technological consequences, as well. Such results can be considered in the academic and policy discussions on the role of cost performance in complex projects and advocate a multi-dimensional perspective on project cost dynamics.

***Strategic Misinterpretation and Cost Estimation***

The results showed that the greatest risk associated with budgetary overrun was a poor cost estimation. This conclusion strengthened the findings of Wuni and Shen (2022) who described that massive infrastructure projects in Asia and Africa often were characterized by the optimism bias and a lack of references to historical costs. It was also proved that the inaccuracies were not always those caused by the technical limitations but rather by the calculated undervaluation, a practice which is typically connected with what is called the strategic misrepresentation. This coincides with the assertion of Flyvbjerg and Gardner (2023) that the planners of a project tend to cook the numbers to guarantee political endorsement and donor funding.

There are more sources that can confirm this systematic problem. Baloyi and Bekker (2023) reported an observation of persistently underbudgeted South African megaprojects because of the institutional benefits that were attributed to the initiation point of the projects and not adherence to project designs. Likewise, Gunawan et al. (2023) stressed that there were several common early-stage underestimations of escalation factors; those were tariff on imports, delays in regulation, and currency fluctuations, which violated the cost baseline.

***Change control failures and Scope Creep***

The study identified that the cause of scope changes was often the emerging demands of stakeholders, political orders or changes to policy structures, especially on the projects in the field of the construction of public infrastructure and digitalization. It supports the opinions of Udeaja et al. (2023), according to whom major changes may cause downstream financial consequences without any organized change control procedures in place.

Moreover, the current study reflected the comments of Păunescu and Dima (2022), who observed that transportation projects sponsored by the European Union, become the regular victims of late-stage design changes, caused by the response to community opposition, or politics. In this research, examples were given by interviewees of the scope change mid-implementation, i.e. basic infrastructure upgrade to the smart version of the infrastructure or a green energy implementation component to the system, without the budget change. Agyekum et al. (2024) have also shed light on the fact that the inability to reevaluate risks and resource requirements when changing the scope tended to compound the risk of leaking the budget.

***Budgetary Control and Risk Management***

The results exhibited that there was a high positive correlation between budget adherence and integrated risk management. Those projects that integrated actual-time risk monitoring and contingency planning recorded a considerable continuous deviations in costs. This does concur with the position by Keers and van Fenema (2021) who proposed dynamic risk registers that can adapt to emerging threats as projects develop.

These two studies also confirm this connection. Amin et al. (2023) found that in Indonesia, projects in which probabilistic risk modelling approaches, including the Monte Carlo simulation, were used, resulted in more realistic outcomes on budgets than their static alternative. Similarly, in the Kenyan public works projects, a study by Otieno and Aduda (2023) indicated that the lack of risk cushioning against inflation, logistics delays and labor strikes meant that the unforeseen expenditures rose by 28%.

***Institutional Complex And Stakeholder Coordination***

These conclusions are similar to the study of Osei-Kyei et al. (2023), which highlighted the complexity of governance in the public-private partnerships and its adverse effect on the budgetary performance.Andersen and Petersen (2022) also confirm this conclusion by demonstrating that Norwegian oil and gas megaprojects have experienced severe cost overruns because of blurred mandate of the stakeholders and regular conflicts between the state and the industry. The interviewees in the present study complained of cases in which the miscommunication of the stakeholders created opposing technical demands and repetition of work. These failures in institutions are in line with Raziq et al. (2024), who reported that, in South Asian infrastructure projects, cross-agency coordination failures frequently resulted in duplications of costs and reworking. It is shaping out that stakeholder engagement should not only be treated as a consultation but it should be transformed into collaborative governance with rules, roles and responsibilities and conflict resolution strategies.

***The Use Of Technology In Cost Control***

These results fall within the strengths of Kim and Kim (2023) where their study concluded that BIM integration of South Korean transport projects cut down BIM associated over-costs by 18 per cent. The people who participated in this research observed that the digital tools made it easier to recognize the problems of inconsistency in designs as early as possible, to monitor the real-time costs incurred in procurement processes, as well as raising red flags on the inconsistency of spending habits.Further study conducted by Liu et al. (2023) confirmed the benefits of digital twin simulation in predict of cost risks in complex engineering projects. Besides this, Rezaei et al. (2024) demonstrated that the cost modeling based on AI greatly exceeded the traditional cost estimation approaches in the projects related to public housing in the Middle East, particularly when the previously managed projects were combined with predictive analytics. Nonetheless, data interoperability and employee resistance as well as training constitute some of the challenges faced by participants reported in the context of Kivleniece and Lannon (2023). Thus, the challenges that the digital tools hold good prospects in are dependent on institutional preparedness, user proficiency and their cross-functional interdependence.

***Sectoral and Regional differences***

Agyekum-Mensah and Knight (2021) echoed these concerns and went further to argue that in West African road development projects, poorly controlled procurement systems resulted in an overpriced procurement system with undue delays in delivery dates.Conversely, the role of the legal battles and stakeholder activism was greater in the high-income areas. According to Lind and Brunes (2022), Scandinavian projects have incurred project overruns because of environmental litigation and opposition by communities. The nature of IT projects considered in the present research made them prone to changes in users needs, regulatory changes, and data integration issues. The quantitative trend is in line with the arguments of Abdullah and Tan (2023), who concluded that cost risk within the digital infrastructure projects was costly, and more due to the volatility of scope and complexity of integration rather than material delays. Such results support the contention that localised strategies should be considered where the political, technical and socio-economic situation of every project should be taken into account.

***Theoretical Model Integration***

The results of the study highly acclaim the so-called Iron Law of Megaprojects created by Flyvbjerg (2021) according to which the issue of a project being over budget, over time, and over scope is inherent. This study however takes it one step higher and brings these insights into the framework of a systems theory and modern revolution models of digital transformation. Projects are socio-technical systems and the cost performance is not influenced by an individual factor but by the interplay between the planning mechanisms, the behavior of the organization, the regulators, and the stakeholder interest (Pinto & Winch, 2022).

Moreover, the work confirms the postulates of the adaptive governance theory according to which, the management of complex projects should be based on flexibility, feedback loop and decentralization. As it has been discussed by Kallio and Nordstrm (2023), successful execution of megaprojects requires considerably more adaptable leadership,

enabling timely reaction to the changes taking place in the environment and on the policy level. The study thus contributes to the science by placing the argument of cost overruns in the classical and emergent frameworks.

**Conclusion**

This paper discussed the age-old problem frequently encountered in large-scale projects: budget overruns and what makes them happen in the first place, as well as how different approaches to project management can help to alleviate the cost-related risks posed therein. Based on both quantitative and qualitative survey of infrastructure, energy and IT professionals, the study came up with a number of key drivers of cost overruns i.e. incorrect initial costs by underestimation, unmanaged scope creep, poor risk management and a lack of coordination amongst stakeholders. However, projects, where advanced tools in cost forecasting, proactive identification of risks, mechanisms of aligning stakeholders, and digital technology, such as BIM and AI were used, showed much better costs.

It was concluded that overruns of budgets are not usually realized because of a single point of degradation, but because of the intertwining of technical choice, institutional arrangements, and human behavior. The results confirmed some of the theoretical frameworks like the Iron Law of megaprojects by Flyvbjerg as well as expanding the discussion to other contemporary drivers like digitalization and adaptive governance. With its disclosure of institutional incentives that encourage strategic misrepresentation and exposure of unstructured change control in so many project contexts, the present research contributes to the expanding literature on the need of structural change in project planning and delivery. Finally, the right combination of highly developed tools and transformation of the organizational culture in the direction of openness, flexibility, and responsibility is the key success factor in cost control.

**Recommendations**

On the basis of the findings of the study, a number of recommendations are being proposed strategically in order to solve the long time challenges of budget overruns in large scale projects. First, the front-end planning and cost estimation stage should be enhanced through the use of past data, estimation of inflation, and current industry standards. Project sponsors are expected to carry out measures such that independent validation is carried out on estimates to reduce biasness of optimism and strategic misrepresentation. Besides, all project teams should institutionalize formal change control processes which evaluate the financial impact of any proposed scope, design, or delivery schedule alteration. These systems ought to incorporate strict record keeping, pre-pay checks and cost-affect mechanisms.

Further, it is very important to include dynamic risk management into the project lifecycle. Risk assessment must be constantly renewed through the measures such as scenario modelling and Monte Carlo simulations and allow to benefit financial threats before they cause serious damage. In conjunction with it, it is crucial to enhance the cooperation of the stakeholders, especially on multi-agency or cross-border initiatives. Clear functions, common online platforms of communication, and common decision-making formats can reduce losses and waste of time and money greatly.

In addition, they should aim at considering the use of the digital tools in the form of Building Information Modeling (BIM), Earned Value Management (EVM), and AI-based forecasting. The technologies improve cost management since they make it possible to monitor all activities in real time and thus detect deviations early. Nevertheless, they can be effective only in case of proper staff training and organizational preparation. Finally an open and frequent cost performance reporting process should be required especially during the case of publicly financed projects to encourage accountability, learning and stature trust. All of these recommendations can have a great impact on cost performance and make the project results more sustainable and efficient.

**Future Research Directions**

This research gives an enlightened idea though there are areas that should be studied deeper. The proposed studies in the future would entail longitudinal case study tracking of the budget over the entire project premiership, covering the conceptual stage right up to the post-completion. This would provide more insight into the effects of early decisions regarding the eventual costs.

Besides, cross-country comparative studies may also be used in order to determine the ways tracking the quality of governance and systems of regulations, as well as cultural variables affect budget performance. As an example, budget overruns in the politically unstable parts of the world could be both different in cause and scale compared to those of the highly regulated economies. The second potential field is the test of AI and machine learning technologies in predictive cost modeling. The development of such technologies may be also the subject of the future research about their accuracy and ability to support decisions in the several types of projects.

Last but not least, gendered and social aspects of cost overruns, e.g., whether non-exclusive approaches to stakeholder engagements minimize budget risks, or the role of frontline workforce involvement in planning procedures in reducing the risk of financial performance, should be worth exploring. Said insights may contribute to the domain of project cost management to a greater degree as well.

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