

Factors Influencing Cost Overruns in Residential Property Development in Port Harcourt Metropolis

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Abstract

Original Research Article

Cost overruns remain a major challenge affecting the financial viability and successful delivery of residential property development projects. This study examined the factors influencing cost overruns and the strategies for managing them in the Port Harcourt metropolis, Rivers State, Nigeria. A cross-sectional mixed-methods design was adopted, combining a questionnaire survey with semi-structured key informant interviews. Quantitative data were obtained from 86 professionals and stakeholders selected through stratified simple random sampling, while five experienced built-environment professionals were purposively interviewed. Questionnaire data were analysed using descriptive statistics and the Relative Importance Index, while qualitative data were analysed thematically. The findings revealed that fluctuation in construction material prices was the most influential factor contributing to cost overruns (RII = 1.000), followed by inflation and macroeconomic instability (RII = 0.993), delayed payment for completed work (RII = 0.988), and inaccurate quantity estimation (RII = 0.963). Other important factors included frequent scope changes, poor site and contract management, material shortages, procurement delays, design errors and inadequate site supervision. Realistic and accurate cost estimation was identified as the most effective management strategy (M = 4.721), followed by the use of advanced technology (M = 4.349), risk assessment and contingency planning (M = 4.186), and detailed budgeting (M = 4.081). The study concludes that cost overruns result from the interaction of economic instability, financial constraints, estimation deficiencies, and weak project management. It recommends realistic cost estimation, timely project financing, effective material procurement, technological cost monitoring, competent contractor selection, and strict adherence to the approved project scope.

Keywords: cost overrun, residential property development, construction materials, cost estimation, project management.

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Introduction

Adequate housing is recognised as a fundamental necessity and serves as a key indicator of socio-economic development. In Nigeria, residential accommodation demand consistently exceeds supply due to rapid population growth, rural-urban migration, and urban expansion. Government estimates place

the national housing deficit at approximately 15 million units, while earlier industry assessments suggested figures as high as 28 million units (Federal Ministry of Housing and Urban Development, 2026). As the capital of Rivers State and a major commercial centre in the Niger Delta, Port Harcourt has experienced sustained population growth and urban expansion,



resulting in significant pressure on its housing stock and prompting increased residential property development by both public agencies and private developers.

Residential property development constitutes a major segment of the real estate sector and is integral to the Nigerian economy, representing a significant portion of national investment (Subramani et al, 2014). The real estate industry accounts for 6.4% of Nigeria's GDP and, after agriculture, is among the largest employment sectors. Ongoing efforts to maximise its potential have contributed to consistent industry growth. Additionally, increased domestic and international manufacturing activities, urban infrastructure development, industrial capital investment, and real estate sector initiatives have collectively driven the expansion of residential property development (Subramani et al, 2014).

Despite increased investment in residential construction, housing project delivery in Port Harcourt, as in many Nigerian cities, often exhibits cost performance that diverges from initial budgets. This issue, known as cost overrun, arises when the final cost of a construction project exceeds its approved or contractual estimate. Cost overrun is a persistent challenge in the construction industry globally, affecting both developed and developing economies. For example, Kaming et al. (1997) identified inflation-driven material price increases, inaccurate quantity estimation, and rising labour costs as principal causes of cost overrun in high-rise building projects in Indonesia, demonstrating the problem's prevalence across diverse national contexts.

In Nigeria, the causes of cost overrun have been the subject of scholarly investigation for several decades. Okpala and Aniekwu (1988) identified material shortages, payment delays, weak contract management, price fluctuations, and fraudulent practices as principal contributors to high construction costs. Elinwa and Buba (1993) similarly highlighted material costs, fraudulent practices, escalating prices, high machinery costs, and inadequate planning as significant factors. Mansfield et al. (1994) reinforced these findings and additionally cited excessive bureaucratic approval procedures and insufficient feasibility studies. Recent research

indicates that these challenges persist. Oluyemi-Ayibiowu et al. (2019), in a study including Port Harcourt, identified risk and uncertainty, limited client financial capacity, weak regulation, fraud and corruption, price variation, and frequent design changes as the most severe contributors to cost overrun in the Nigerian building construction industry.

Residential property development is central to reducing Nigeria's housing deficit and supporting economic growth in urban centres such as Port Harcourt. However, a significant proportion of residential projects in the metropolis experience final costs that substantially exceed original budgets. This trend has wide-ranging consequences: developers face reduced returns on investment and, in severe cases, project abandonment; contractors encounter disputes and strained professional relationships with clients; the supply of affordable housing is further constrained amid rising demand; and confidence in the local construction industry is diminished. Research focused on Port Harcourt's housing sector has identified several conditions that predispose residential projects to cost escalation. Ihuah and Kakulu (2016) reported that confrontational behaviour by host communities, such as land disputes and compensation demand, significantly impedes sustainable residential property development in Port Harcourt, directly affecting project costs and timelines. Additional local studies have cited high building material costs, regulatory approval delays, challenges in land acquisition, and limited access to development finance as persistent obstacles for both public and private residential developers in the metropolis.

Collectively, the literature indicates that cost overrun in residential property development is a complex issue influenced by financial, managerial, material, environmental, and institutional factors. Nevertheless, much of the existing empirical research has concentrated on the broader Nigerian construction industry, public infrastructure, or housing delivery issues only indirectly related to cost performance. This article investigates the primary factors contributing to cost overrun in residential property development within Port Harcourt Metropolis. It reviews relevant literature,

categorises key causal factors, discusses the broader impacts on the housing sector, and proposes practical strategies for mitigation.

2.0 Literature Review

2.2 Concept of Cost Overrun

“Cost overrun” denotes the extent to which the actual final cost of a project surpasses the originally estimated, budgeted, or contracted amount at the pre-construction stage (Okpala & Aniekwu, 1988). The literature also refers to this phenomenon as cost escalation, cost growth, or budget overrun, and it is typically quantified as the percentage difference between the final and baseline project costs. Flyvbjerg et al. (2002) established, using a large international sample of infrastructure projects, that cost overrun is a persistent and widespread issue rather than an isolated occurrence, with nine out of ten projects exceeding their original cost estimates. Unlike cost control failure, cost overrun may result from factors both within and beyond the project team's control, including inaccurate initial estimates, unforeseen site conditions, price inflation, and changes introduced during construction (Kaming et al., 1997).

Cost overrun is one of the most challenging issues facing residential property development. Cost overrun represents a significant challenge in residential property development, impeding project profitability and financial viability (Shah et al., 2023). It is among the most prevalent and disruptive issues in this sector, frequently leading to project delays, reduced profit margins, compromised quality, and, in severe cases, project abandonment or termination (Flyvbjerg, 2021). Cost overrun arises when actual expenditures during project execution exceed the original budget estimate established at the planning stage. In residential property development, this is observed as a discrepancy between the amount budgeted or borrowed by a developer and the actual expenditure upon project completion, or, in cases of abandonment, when work ceases. Residential developers, particularly private individuals and small-scale investors, often have limited access to supplementary financing, which increases the risk of stalled or abandoned projects compared to

well-funded public or commercial developments. In Rivers State, the construction industry has experienced pronounced cost escalations in recent years, attributed by scholars to persistent inflation, exchange rate instability, increased transportation expenses, and rising building material costs (Livinus and Akoh, 2025).

2.2 Concept of Residential Property Development

Residential property development is the process by which land and capital are integrated through planning, financing, design, and construction to create buildings intended primarily for human habitation. Residential properties are buildings developed primarily for habitation, providing protection from external and unknown dangers (Varbuchta and Hromadka, 2023). Mwando et al. (2024) define residential property development as the transformation of land or existing structures into housing units intended for human habitation. This process encompasses a variety of housing typologies, including single-family detached houses, duplexes, blocks of flats, and large-scale housing estates. It involves multiple stakeholders such as developers, financiers, design consultants, contractors, and regulatory authorities. In rapidly urbanising Nigerian cities like Port Harcourt, residential property development is increasingly driven by private investment, supplementing the limited direct housing provision by government agencies (Ihuah & Kakulu, 2016).

Residential property development involves a series of coordinated activities, including land acquisition, feasibility analysis, planning, design, financing, construction, marketing, and property management. Its primary objective is to provide adequate, safe, functional, and affordable housing that meets the needs of individuals, families, and communities (Zhao & Liu, 2023). Residential properties encompass bungalows, detached houses, semi-detached houses, duplexes, terraced houses, flats, apartments, and housing estates. Zhao and Liu (2023) assert that residential property development significantly contributes to economic growth by stimulating investment, creating employment opportunities, improving

living standards, and supporting urban development.

Residential property is widely recognised as a critical component of national development, as it provides shelter, promotes social stability, enhances quality of life, stimulates economic growth, and contributes to household wealth creation (UN-Habitat, 2024). Carvalho et al. (2023) emphasise that successful residential property developments require coordination among multiple stakeholders, including developers, investors, architects, engineers, quantity surveyors, contractors, financial institutions, government agencies, and end users. Contemporary residential property development now extends beyond traditional shelter provision to incorporate sustainability principles, smart technologies, environmental responsibility, and community-oriented design approaches that aim to improve residents' quality of life and promote sustainable urban development (Bello et al., 2024; Odum et al., 2024). Recent studies indicate that sustainable residential developments are increasingly attractive to investors and occupants due to their long-term economic and environmental benefits.

2.3 Categorisation of Cost Overrun Factors

A recurring theme in construction management literature is the classification of cost overrun causes into broad categories to facilitate analysis and comparison across studies. While the specific groupings differ among authors, several categories are commonly identified:

- i. Client-related factors include delays in payment for completed work, frequent changes in project scope or design instructions, limited financial capacity, unclear project requirements, design modifications, delayed decision-making, and inappropriate contractor selection (Doloi, 2013; Johnson & Babu, 2020; Okpala & Aniekwu, 1988; Oluyemi-Ayibiowu et al., 2019).
- ii. Contractor-related factors include weak site management, inadequate supervision, inaccurate bidding, poor workmanship, rework, ineffective cost control, inadequate planning and

scheduling, and the engagement of contractors lacking sufficient technical or financial capacity (Azhar et al., 2008; El-Ahwal et al., 2016; Mansfield et al., 1994).

- iii. Consultant-related factors include inaccurate quantity estimation, design errors, delays in reviewing or approving project documents, incomplete documentation, inadequate site investigations, delayed approvals, and poor coordination among professionals (Kaming et al., 1997; Creedy et al., 2010; Doloi, 2013).
- iv. Material and resource-related factors encompass fluctuations in the prices of building materials, material shortages, procurement delays, rising costs of labour, plant, and machinery, labour scarcity, low productivity, material wastage, and equipment breakdowns (Elinwa & Buba, 1993; Azhar et al., 2008; El-Ahwal et al., 2016).
- v. External and environmental factors include inflation, adverse weather conditions, unstable government policy, weak regulatory control, disputes with host communities over land and compensation in the Port Harcourt context, exchange-rate fluctuations, regulatory changes, political instability, bureaucratic delays, poor site accessibility, and unforeseen ground conditions (Ihuah & Kakulu, 2016; Oluyemi-Ayibiowu et al., 2019; Creedy et al., 2010; Khodeir & Mohamed, 2015). Although presented as distinct categories, these factors are interrelated and may involve multiple project stakeholders.

This categorisation offers a structured analytical framework for the present study, which assesses the relative significance of factors from each group within the context of residential property development in Port Harcourt metropolis.

2.4 Theoretical Framework

This study is grounded in two complementary theoretical perspectives from the project

management and planning literature: the Iron Triangle theory of project success and stakeholder theory as it relates to cost overrun.

2.4.1 The Iron Triangle Theory

The Iron Triangle, also known as the triple constraint, posits that project success is conventionally measured against three interdependent criteria: cost, time, and quality (Atkinson, 1999). This framework requires project managers to balance trade-offs among these dimensions; for instance, compressing the project schedule often increases pressure on cost and quality. Atkinson (1999) further notes that cost and time targets established during the planning stage are typically informed estimates made when project information is limited, which contributes to frequent deviations such as cost overruns in the construction industry. The Iron Triangle is pertinent to this study as it conceptualises cost overrun as one aspect of a broader, interconnected system of project performance, where deficiencies in time management, scope control, or quality assurance can lead to cost escalation.

2.4.2 Stakeholder theory

Stakeholder theory, originally developed by **R. Edward Freeman (1984)** in *Strategic Management: A Stakeholder Approach*, posits that the success of an organisation or project depends on its capacity to recognise, engage, and balance the interests of individuals and groups who can affect or are affected by the achievement of its objectives. Freeman (1984) contends that organisations should consider the interests of all stakeholders, not just shareholders, as stakeholder actions and decisions significantly influence project outcomes. Subsequent scholars have extended the application of stakeholder theory to project management and construction studies. Kivits and Swang (2021) define stakeholders as individuals or groups that can affect or be affected by the achievement of organisational objectives. The theory emphasises that project success is largely contingent upon effective stakeholder identification, engagement, and management. In residential property development, stakeholders

include property developers, contractors, consultants, investors, financial institutions, government agencies, host communities, and end-users. According to stakeholder theory, conflicts among stakeholders, poor communication, and inadequate engagement can adversely impact project performance. Stakeholder theory serves as a secondary theoretical framework for this research because it explains several stakeholder-related impacts and factors identified in the literature review. Examples include community interference, government policies, scope modifications, delayed approvals, and stakeholder dissatisfaction, all of which influence project costs. In Rivers State, community disputes and government regulatory requirements frequently affect residential property development. Thus, stakeholder theory offers a valuable framework for understanding how stakeholder interactions contribute to project cost overruns and affect residential property development outcomes.

Together, these two theories inform the conceptual approach of this study. The Iron Triangle highlights the interconnected and systemic nature of cost performance, while stakeholder theory emphasises the influence of stakeholder interactions on project cost overruns and residential property development outcomes. This dual framework supports the study's objective of identifying and assessing a broad range of factors—including planning, management, material, and external dimensions rather than attributing cost overruns to a single cause.

2.5 Empirical Review

Empirical investigations into the causes of cost overrun have spanned several decades and encompass both developed and developing economies. Rahman et al. (2013) identified client requirements regarding quality, poor design and design delays, unrealistic contract durations, lack of experience imposed by requirements, late delivery of materials and equipment, management-labour relations, fluctuations in material prices, contractor cash flow and financial difficulties, and material shortages as the most influential factors contributing to cost overrun in Malaysia.

Shanmuganathan and Baskar (2015) reported that in India, key factors include incomplete initial designs, poor contracts, ineffective construction management, inadequately established cost control systems, deficient site management, additional work, improper planning, and changes or discrepancies arising during the construction period. Flyvbjerg et al. (2002), in a study of 258 transportation infrastructure projects across multiple countries, found that cost overruns were both common and statistically consistent over a seventy-year period, indicating that the issue is deeply rooted in project planning practices rather than the result of occasional miscalculations. Similar conclusions have been drawn in studies of the South African construction industry, where cost and schedule overruns have been linked to poor planning, weak cost control, and coordination challenges among project stakeholders (Mukuka et al., 2015).

In Nigeria, foundational studies by Ameh (2010) and Elinwa and Buba (1993) are frequently cited regarding the causes of cost overrun. Ameh (2010) identified economic instability, material shortages, government policies, dominance of the construction industry by foreign firms and aid, project location, and the absence of construction cost data as key factors. Elinwa and Buba (1993) similarly found that material costs, fraudulent practices, escalating material prices, high machinery costs, and poor planning were significant contributors to cost overruns in Nigerian projects. Mansfield et al. (1994), in a broader study of Nigerian construction projects, reached similar conclusions and additionally highlighted excessive bureaucratic approval procedures and inadequate feasibility investigations during the pre-construction stage.

Recent Nigerian studies indicate that these fundamental issues have persisted, although the prioritisation of specific factors has changed. Oluyemi-Ayibiowu et al. (2019), whose research included Port Harcourt metropolis, identified risk and uncertainty, clients' limited financial capacity, weak regulation and control, project fraud and corruption, price variation, and indiscriminate design changes as the most severe contributors to cost overrun in the Nigerian building construction industry. The shift from predominantly material- and payment-related

causes in earlier decades to risk-, regulatory-, and governance-related factors in recent studies suggests an evolving construction environment in Nigeria, even as cost overruns remain a persistent issue.

A limited body of literature has focused on construction and housing delivery challenges unique to Port Harcourt metropolis. Ihuah and Kakulu (2016) reported that confrontational behaviour by host communities, such as land ownership disputes and compensation demands, significantly impedes the sustainable development of residential property in Port Harcourt, directly increasing costs for developers who must address these disputes during or before construction. Additional local studies have identified high building material costs, regulatory approval delays, difficulties in land acquisition, and restricted access to development finance as recurring obstacles for both public and private residential developers. Although these studies offer valuable contextual insights, few have specifically isolated and ranked the primary factors responsible for cost overrun in residential property development in Port Harcourt. This gap is the focus of the present study.

The literature documents a range of adverse effects associated with cost overrun, impacting developers, contractors, consultants, and the broader housing market. At the project level, cost overrun often leads to reduced returns on investment for developers, disputes and strained relationships between clients and contractors, project delays, and, in severe cases, project abandonment (Mukuka et al., 2015). In their study of construction schedule overruns in South Africa, Mukuka et al. (2015) identified time extensions, cost overruns, profit losses, disputes, and diminished work quality resulting from efforts to accelerate delayed projects as the most significant effects reported by construction professionals.

At a broader scale, the accumulation of cost overruns across multiple residential projects reduces the overall housing supply, as some developments stall before completion, and may also undermine investor confidence in the residential property sector. In markets like Port Harcourt, where demand for accommodation

exceeds supply, project abandonment due to cost overrun is especially detrimental for both individual developers and efforts to address Nigeria's housing deficit.

The literature proposes several strategies to reduce the incidence and severity of cost overrun in construction projects. These include adopting realistic and detailed cost estimation methods during planning, utilising project management scheduling and cost control tools throughout construction, and adhering to the approved project scope to limit costly variations and design changes. Additional recommendations involve selecting contractors and consultants with sufficient technical expertise and financial capacity, maintaining open and regular communication among stakeholders, and strengthening regulatory oversight to minimise opportunities for fraud and price manipulation (Oluyemi-Ayibiowu et al., 2019). Aziz et al. (2013) identified fifteen strategies for mitigating cost overruns in residential projects, including effective strategic planning, proper project scheduling, effective site management, frequent progress meetings, leveraging past experience, engaging experienced subcontractors and suppliers, employing appropriate development methods, utilizing up-to-date technology, ensuring clear communication, frequent coordination among parties, comprehensive preconstruction planning, developing human resources, robust contract administration, systematic control mechanisms, and improved contract award procedures. Ahmed et al. (2023) recommended strategic approaches such as detailed budgeting, accurate cost estimation, clear project goals and objectives, regular progress monitoring, implementing change management processes, hiring experienced project managers, adopting lean construction practices, leveraging technology for cost management, risk and scope management, effective communication, resource management, and contingency planning.

The reviewed literature establishes that cost overrun is a persistent and well-documented issue in the construction industry, both globally and in Nigeria, with causes spanning financial, managerial, material, and external factors. Nigerian studies over the past three decades, from Okpala and Aniekwu (1988) to Oluyemi-

Ayibiowu et al. (2019), consistently identify similar categories of contributing factors, although their relative importance has shifted over time. However, much of the existing literature either addresses the Nigerian construction industry broadly, focuses on public or infrastructure projects, or, in the case of Port Harcourt-specific studies, emphasises broader housing delivery or land-related challenges rather than isolating and ranking the factors responsible for cost overruns in residential property development. This study aims to fill that gap by providing a focused, contemporary empirical analysis of the factors influencing cost overruns in residential property development in Port Harcourt metropolis.

3.0 Methodology

A mixed-methods design was employed, integrating a quantitative questionnaire survey with qualitative key informant interviews to examine the factors and effects of cost overruns in residential property development projects in Port Harcourt metropolis, Rivers State. This methodology facilitated the collection of both numerical data and in-depth professional perspectives, supporting the triangulation of findings (Creswell & Plano Clark, 2017; Schoonenboom & Johnson, 2017). The target population included architects, engineers, quantity surveyors, estate surveyors and valuers, contractors, project managers, and property developers engaged in residential development. Using Cochran's finite population correction formula at a 95% confidence level and a 5% margin of error, a sample of 86 respondents was drawn from an estimated population of 110. Stratified simple random sampling was applied to select questionnaire respondents, while five experienced professionals were purposively chosen as key informants. Data collection instruments included a structured questionnaire measured on a five-point Likert scale and a semi-structured interview guide. Quantitative data were analysed using frequencies, percentages, mean scores, and the Relative Importance Index with Microsoft Excel and SPSS. Interview recordings were transcribed, coded, and analysed thematically. Quantitative and qualitative findings were integrated during interpretation to

identify areas of convergence and to provide a comprehensive explanation of cost overruns. Content validity was ensured through expert review, and reliability and credibility were enhanced by clear instrument wording, consistent administration, and data triangulation. Participation was voluntary, informed consent was obtained, and respondents' identities and responses were kept confidential.

4.0 Results and Discussion

This section presents data obtained from the administered questionnaire and semi-structured interviews, consistent with the research design and data analysis methods outlined in the methodology. It addresses the questionnaire response rate, respondents' background characteristics, analysis of factors influencing

cost overruns in residential property development in Port Harcourt metropolis, mitigation strategies, and a discussion of findings in relation to the reviewed literature.

4.1 Sample Profile and Respondent Background

To ensure the empirical credibility of the survey findings, the demographic and professional background characteristics of the respondents were evaluated. Of the distributed instruments, 86 valid questionnaires ($N = 86$) were completed and retrieved for analysis. The background variables examined include professional roles, industry operational sectors, and cumulative years of technical experience within the built environment.

Table 1: Background Characteristics of Respondents

S/N	Variable	Category	Frequency	Percentage (%)
1	Job Responsibility of Respondents	Estate Surveyor and Valuers	36	42%
		Project Manager	19	22%
		Civil/Structural Engineer	8	9%
		Quantity Surveyor	12	14%
		Owner	11	13%
2	Industry Type of Respondents	property development industry	35	41%
		agency and marketing industry	12	14%
		property management industry	27	31%
		valuation industry	12	14%
3	Years Experience of	Below 5 years	11	13%
		5 – 10 years	36	42%

	11 – 15 years	31	36%
	Above 15 years	08	09%

Source: Field Survey, 2026

Professional Composition of Respondents

The sample includes a diverse cross-section of key stakeholders in the real estate and construction industries. Estate surveyors and valuers constituted the largest professional group, representing 41.9% ($n = 36$) of the total sample. Project managers comprised 22.1% ($n = 19$), quantity surveyors 14.0% ($n = 12$), property owners/developers 12.8% ($n = 11$), and civil/structural engineers 9.3% ($n = 8$). Together, estate surveyors, quantity surveyors, and project managers and property management specialists represented 78.0% of respondents. This distribution indicates that the dataset predominantly reflects the perspectives of professionals responsible for financial appraisals, project budgeting, site valuations, and contract administration in residential developments.

Distribution by Industry Sector

Regarding primary operational focus, the largest proportion of respondents worked in property development 40.7%, (35 Nr), followed by property management 31.4%, (27 Nr). The remaining participants were evenly divided between agency/marketing and specialised valuation practice, each representing 14.0% (12 Nr) of the sample. With 72.1% of respondents engaged in property development or estate management, the data provides firsthand operational perspectives from practitioners involved throughout the asset lifecycle, including initial funding, construction execution, ongoing management, and asset valuation.

Industry Experience of Respondents

The work experience profile indicates a mature and experienced respondent pool. Most participants 41.9%, (36 Nr) had between 5 and

10 years of professional practice, while 36.0% (31 Nr) reported 11 to 15 years of experience. Senior practitioners with more than 15 years in the field comprised 9.3% (8 Nr), and early-career respondents (less than 5 years of experience) accounted for 12.8% (11 Nr). In total, 87.2% (75 Nr) of respondents had at least 5 years of industry experience, and nearly 45% had worked in the sector for over a decade. This substantial practical exposure enhances the reliability, construct validity, and technical authority of the survey data concerning cost dynamics in residential project delivery.

4.2 Factors Influencing Cost Overrun in Residential Property Development Projects

This section aims to identify the factors contributing to cost overruns in residential property development projects, as consolidated from the literature review. All five interviewees, each representing a different professional sector, indicated that multiple factors contribute to cost overruns in residential projects. These factors include planning, design, construction, scope, financial policy, and the estimation process.

“... In most cases, our cost overruns are led by several factors in residential projects, and these factors lead to either abandonment or a 40% initial cost increment in residential projects....” (Transcribed interviews, 2026)

“...there are nineteen factors of cost overrun as mentioned, but knowing the factors that relate to another helps the owner or developer to know which to consider first so as to avoid cost overrun in residential projects...” (Transcribed interview, 2026)

Another interviewee said, “Knowing the relationship between these factors is good, but identifying the most critical factors that lead to

cost overrun is very vital, as it helps developers in proper and effective project development...” (Transcribed interview, 2026)

Further exploration of this theme was conducted using a questionnaire. The Relative Importance Index (RII) was applied to rank the factors influencing cost overruns in residential property

development in Port Harcourt metropolis, based on respondents' ratings on a five-point Likert scale. The factors are categorised into five groups established in the literature review: client-related, contractor-related, consultant-related, material-related, and external or environmental factors. These results are presented in Table 2 below.

Table 2: Ranking Factors of Cost Overrun in Residential Projects

Factors of Cost Overrun	SA)	D	N	A	SA	RII	Rank
Fluctuation in the prices of construction materials (material-related)	0	0	0	0	86	1.000	1 st
Inflation / macroeconomic instability (external)	0	0	0	3	83	0.993	2 nd
Delay in payment for completed work (client-related)	0	0	1	3	82	0.988	3 rd
Inaccurate quantity estimation (consultant-related)	0	0	8	0	78	0.963	4 th
Frequent changes in project scope/design (client-related)	0	0	8	70	8	0.800	5 th
Poor site/contract management (contractor-related)	0	0	16	62	8	0.781	6 th
Shortage of construction materials (material-related)	0	0	9	77	0	0.779	7 th
Delays in material procurement and delivery (material-related)	0	2	6	78	0	0.777	8 th
Design errors and incomplete design documentation (consultant-related)	0	2	14	62	8	0.776	9 th
Inadequate site supervision (contractor-related)	0	0	8	76	0	0.763	10 th
Inappropriate selection of contractors (client-related)	0	15	40	23	8	0.656	11 th
Inadequate site and geotechnical investigations (consultant-related)	0	15	39	32	0	0.639	12 th
Poor workmanship and construction errors (contractor-related)	0	8	54	24	0	0.637	13 th
Land ownership and community disputes (external)	0	22	40	24	0	0.605	14 th
Political instability and inconsistent government policies external)	0	8	70	8	0	0.600	15 th
Material wastage during construction (material-related)	0	23	55	7	1	0.567	16 th

Source: Field Survey, 2026

The ranking is derived from a survey of 86 respondents, with the Relative Importance Index (RII) calculated for each factor. The results demonstrate that all identified factors contribute to cost overruns, although the extent of their influence varies considerably. The Relative Importance Index (RII) values range from 0.567 to 1.000, indicating varying levels of significance among the sixteen evaluated factors. The four highest-ranking factors exhibit near-unanimous agreement among respondents (RII > 0.960), underscoring that macroeconomic volatility and core financial or estimating risks are the principal drivers of project cost escalation. Fluctuations in construction material prices (RII = 1.000, Rank 1st) are identified as the most critical factor, with 100% agreement among respondents (SA = 86%). Price volatility in essential building components, such as cement, reinforcement steel, and roofing materials, consistently undermines original budget estimates both prior to and during project execution. Inflation and macroeconomic instability (RII = 0.993, Rank 2nd) closely follow, as macroeconomic pressures directly increase labour, transport, and equipment overhead costs, rendering fixed-price contracts unsustainable over prolonged construction periods. Delay in payment for completed work (RII = 0.988, Rank 3rd) arises from client cash flow constraints, which significantly impede contractor progress. Unpaid valuation certificates result in contractors incurring financing charges, interest penalties, and extended site setup costs, thereby inflating overall expenditures. Inaccurate quantity estimation (RII = 0.963, Rank 4th) is attributed to pre-contract errors by consultants during Bill of Materials (BOM) preparation, leading to structural budget underestimations and substantial financial variation claims once construction commences.

Factors ranked fifth through tenth emphasise operational and managerial challenges involving clients, consultants, contractors, and material supply chains. Client and design dynamics, such as frequent changes in project scope or design (RII = 0.800, 5th) and design errors or incomplete documentation (RII = 0.776, 9th), illustrate how scope changes and unresolved

working drawings necessitate rework, variation orders, and extended contract durations. Supply chain and material management issues, including shortages of construction materials (RII = 0.779, 7th) and delays in material procurement and delivery (RII = 0.777, 8th), demonstrate that supply chain disruptions impede site progress and indirectly increase site maintenance and equipment costs. Contractor site execution factors, such as poor site or contract management (RII = 0.781, 6th) and inadequate site supervision (RII = 0.763, 10th), indicate that insufficient administrative oversight leads to idle labour and poor adherence to project schedules.

The remaining factors, ranked eleventh to sixteenth, are considered secondary or localised cost drivers. Procurement and pre-planning issues, such as inappropriate contractor selection (RII = 0.656, 11th) and inadequate site or geotechnical investigations (RII = 0.639, 12th), suggest that awarding contracts based solely on lowest-price tenders or omitting subsoil testing contributes to cost overruns, albeit less frequently than material and macroeconomic factors. Quality and external interruptions, including poor workmanship (RII = 0.637, 13th), land ownership or community disputes (RII = 0.605, 14th), and political instability or policy changes (RII = 0.600, 15th), are acknowledged as significant risks, though their impact is often regional or dependent on specific site conditions. Material wastage (RII = 0.567, Rank 16th), while present on most sites, is ranked lowest by respondents, indicating that physical waste is generally manageable compared to market price volatility and supply chain disruptions.

4.3 Strategies for Managing Cost Overruns in Residential Property Development

This section aims to identify and establish strategies for managing cost overruns in residential property development projects in Port Harcourt. Analysis of the data, including qualitative semi-structured interviews and questionnaire responses (Table 3), indicates that all interviewees (n=5) identified accurate cost estimation, advanced technology, and risk assessment with contingency planning as the primary strategies for managing cost overruns in

these projects (Transcribed Interview, 2026).

The professional interviewees confirmed the following:

“...most residential projects do not face cost overruns when accurate estimation is conducted, which is only achieved by using current market prices for materials and ensuring the project is developed within three months of budgeting. Advanced technology assists in tracking project costs to identify potential increases. Additionally, contingency planning addresses the impacts of cost overruns on projects” (Transcribed Interview, 2026).

Furthermore, all interviewees (n=5) emphasised that accurate estimation is essential in residential project development. They also highlighted the importance of contingency planning and risk assessment tools, noting that cost tracking becomes more efficient when advanced technology is utilised (Transcribed Interview, 2026).

To corroborate the qualitative findings, Table 3 presents descriptive statistics, including mean, standard deviation, and a ranking of the strategies for managing cost overruns in residential property development projects from highest to lowest magnitude.

Table 3: Strategies of Managing Cost Overrun in Residential Projects

Items	N	Minimum	Maximum	Mean	Std. Deviation	Ranking
Realistic and accurate cost estimation at planning stage	86	4.0	5.0	4.721	.4512	1 st
Advance Technology (Software)	86	3.0	5.0	4.349	.6466	2 nd
Risk Assessment and Contingency planning	86	3.0	5.0	4.186	.5843	3 rd
Detailed Budget	86	4.0	5.0	4.081	.2750	4 th
Engaging experienced, financially capable contractors	86	3.0	5.0	3.907	.5231	5 th
Adherence to originally approved project scope	86	3.0	5.0	3.733	.7581	6 th
Improved communication among stakeholders (Effective Communication)	86	2.0	5.0	3.198	.8376	7 th
Establish Clear Project Goals	86	2.0	5.0	2.919	1.0084	8 th
Valid N (listwise)	86					

Source: Field sheet, 2025

The results demonstrate that realistic and accurate cost estimation during the planning stage was identified as the most effective strategy for controlling cost overruns in residential property development projects, with a

mean score of 4.721 and a standard deviation of 0.4512. This outcome indicates strong and consistent agreement among respondents. The adoption of advanced technology ranked second (mean = 4.349), followed by risk assessment and

contingency planning (mean = 4.186, standard deviation = 0.5843). The preparation of a detailed project budget also received a high rating (mean = 4.081) and exhibited the lowest standard deviation (0.2750), reflecting the highest level of consensus. The engagement of experienced and financially capable contractors achieved a mean score of 3.907. Adherence to the originally approved project scope yielded a mean of 3.733 and a standard deviation of 0.7581, suggesting greater variability in respondents' perspectives. Improved communication among project stakeholders was rated moderately (mean = 3.198, standard deviation = 0.8376). Establishing clear project goals received the lowest mean score (2.919) and the highest standard deviation (1.0084), indicating substantial disagreement regarding its effectiveness as an independent cost control strategy. Collectively, the quantitative and qualitative findings highlight accurate cost estimation, advanced technology, risk assessment and contingency planning, detailed budgeting, appropriate contractor selection, effective resource and scope management, and enhanced stakeholder communication as key strategies for managing cost overruns in residential property development projects.

5. Discussion of Findings

The results indicate that cost overruns in residential property development projects in Port Harcourt are primarily driven by material, economic, financial, and estimation-related factors. Fluctuations in construction material prices were identified as the most significant contributor, followed by inflation, macroeconomic instability, delayed payments for completed work, and inaccurate quantity estimation. These findings suggest that unstable market conditions, insufficient client financing, and deficiencies in preconstruction cost planning represent the most critical threats to project cost performance. Interview data corroborated these results, with key informants highlighting deficiencies in planning, financing, estimation, and construction management as major causes of cost escalation.

These results align with previous studies by Okpala and Aniekwu (1988), Elinwa and Buba

(1993), and Kaming et al. (1997), which identified material price fluctuations, inflation, payment delays, material shortages, and inaccurate estimation as significant causes of construction cost overruns. Additional factors, including frequent scope changes, inadequate site and contract management, procurement delays, design errors, incomplete documentation, and insufficient supervision, also received high rankings. This evidence demonstrates that cost escalation arises not only from economic conditions but also from weaknesses in project planning, coordination, and execution. Although land and community disputes and inconsistent government policies were ranked lower, they remain relevant in the Port Harcourt context, where land ownership conflicts and compensation demands can delay project delivery.

In terms of mitigation strategies, realistic and accurate cost estimation was identified as the most effective approach, followed by the adoption of advanced technology, comprehensive risk assessment and contingency planning, and detailed budgeting. Qualitative data further underscored the importance of utilising current market pricing, implementing cost tracking software, and maintaining adequate contingency provisions. These findings are consistent with the recommendations of Oluyemi-Ayibiowu et al. (2019) and Ahmed et al. (2023), who advocate for accurate estimation, thorough budgeting, technology adoption, risk management, scope control, and effective communication to reduce cost overruns. In summary, effective cost control in residential development necessitates realistic estimates, timely project financing, disciplined scope management, careful contractor selection, efficient material procurement, and continuous monitoring of project expenditures.

6. Conclusions and Recommendations

This study examined the factors contributing to cost overruns in residential property development projects within Port Harcourt Metropolis, drawing on questionnaire responses from 86 built environment practitioners and qualitative insights from key informants. The results indicate that cost overruns are primarily

caused by fluctuations in construction material prices, inflation and macroeconomic instability, delayed payments, inaccurate quantity estimation, scope changes, and inadequate project management. Both external economic pressures and internal project management deficiencies were found to significantly influence project cost performance. These findings support the Iron Triangle and Stakeholder theories by demonstrating that project cost performance is closely associated with time, scope, quality, and stakeholder coordination. Persistent cost overruns reduce developers' returns, increase the frequency of disputes and project abandonment, and further constrain the supply of affordable housing in Port Harcourt Metropolis. To address these challenges, it is recommended that developers and contractors implement realistic contingency provisions, incorporate flexible price adjustment clauses, and procure essential construction materials early to mitigate exposure to inflation and price fluctuations. Clients should secure reliable funding arrangements before project commencement, ensure timely payment for completed work, and minimise changes to approved designs and project scope during construction. Quantity surveyors are advised to prepare cost estimates based on current market rates and comprehensive quantity assessments. Architects and engineers should complete detailed designs, site investigations, and geotechnical studies prior to tendering. Contractor selection should prioritise technical competence, relevant experience, and financial capacity rather than focusing solely on tender price. Early engagement with host communities and relevant regulatory authorities is essential to minimise land disputes, compensation demands, and interruptions to construction activities. Furthermore, professionals are encouraged to adopt digital cost management systems and Building Information Modelling to improve quantity estimation, expenditure monitoring, information sharing, and coordination throughout the project lifecycle.

References

- Ahmed, S., Ahmed, S., & Buriro, A. (2023). Strategies and best practices for managing cost overruns in the construction industry of Pakistan. *Propel journal of academic research*, 3(1), 28-55.
- Ameh, J. (2010). Significant factors causing cost overruns in telecommunication projects in Nigeria. *Journal of Construction in.... Journal of Construction in Developing Countries*, 15(2), 49–67, 2010
- Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International journal of project management*, 17(6), 337-342.
- Azhar, N., Farooqui, R. U., & Ahmed, S. M. (2008, August). Cost overrun factors in construction industry of Pakistan. In *First International Conference on Construction in Developing Countries (ICCIDC-I), Advancing and Integrating Construction Education, Research & Practice* (pp. 499-508).
- Aziz, A. A. A., Memon, A. H., Rahman, I. A., & Karim, A. T. A. (2013). Controlling cost overrun factors in construction projects in Malaysia. *Research Journal of Applied Sciences, Engineering and Technology*, 5(08), 2621-2629.
- Bello, A. O., Okanlawon, T. T., Wuni, I. Y., Arogundade, S., & Oyewobi, L. O. (2024). Exploring the nexus between the barriers and drivers for sustainable smart cities in developing countries: The case of Nigeria. *Sustainable Development*, 32(4), 4097-4113.
- Carvalho, R., Liu, T., Zhang, F., Yu, R., & Oh, E. (2023). Key themes of build-to-rent: developing a conceptual framework for achieving successful developments through a systematic literature review. *Buildings*, 13(8), 1926.
- Creedy, G. D., Skitmore, M., & Wong, J. K. (2010). Evaluation of risk factors leading to cost overrun in delivery of highway construction projects. *Journal of construction engineering and management*, 136(5), 528-537.

- Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research*. sage.
- Doloi, H. (2013). Cost overruns and failure in project management: Understanding the roles of key stakeholders in construction projects. *Journal of construction engineering and management*, 139(3), 267-279.
- El-Ahwal, M., El-Attar, S. S., & Abdel-Hafez, W. A. (2016). Factors leading to cost overrun occurrence in construction projects. *Port-Said Engineering Research Journal*, 20(1), 71-77.
- Elinwa, A. U., & Buba, S. A. (1993). Construction cost factors in Nigeria. *Journal of construction engineering and management*, 119(4), 698-713.
- Federal Ministry of Information and National Orientation. (2026, January 26). *FG's Technical Committee releases new housing data, pegs deficit at 15 million units*.
- Flyvbjerg, B. (2021). Top ten behavioral biases in project management: An overview. *Project management journal*, 52(6), 531-546.
- Flyvbjerg, B., Holm, M. S., & Buhl, S. (2002). Underestimating costs in public works projects: Error or lie?. *Journal of the American planning association*, 68(3), 279-295.
- Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach*. Pitman Pub_Lishing, Boston
- Gonzalez-Porras, L. (2026). Diversity in Project Stakeholder Engagement: How Stakeholder Perceptions Shape Engagement Types in Megaprojects. *Project Management Journal*, 87569728261429823.1-18
- Ihuah, P. W., & Kakulu, I. I. (2016). Assessment of communities landholding assertiveness effects on sustained residential properties development in Nigeria: a case of Port Harcourt conurbations. *African Journal of Economic and Sustainable Development*, 5(3), 193-213.
- Johnson, R. M., & Babu, R. I. I. (2020). Time and cost overruns in the UAE construction industry: a critical analysis. *International journal of construction management*, 20(5), 402-411.
- Kaming, P. F., Olomolaiye, P. O., Holt, G. D., & Harris, F. C. (1997). Factors influencing construction time and cost overruns on high-rise projects in Indonesia. *Construction Management & Economics*, 15(1), 83-94.
- Kaming, P. F., Olomolaiye, P. O., Holt, G. D., & Harris, F. C. (1997). Factors influencing construction time and cost overruns on high-rise projects in Indonesia. *Construction Management & Economics*, 15(1), 83-94.
- Khodeir, L. M., & Mohamed, A. H. M. (2015). Identifying the latest risk probabilities affecting construction projects in Egypt according to political and economic variables. From January 2011 to January 2013. *HBRC journal*, 11(1), 129-135.
- Khodeir, L. M., & Mohamed, A. H. M. (2015). Identifying the latest risk probabilities affecting construction projects in Egypt according to political and economic variables. From January 2011 to January 2013. *HBRC journal*, 11(1), 129-135.
- Kivits, R., & Sawang, S. (2021). Stakeholder theory. In *The dynamism of stakeholder engagement: A case study of the aviation industry* (pp. 1-8). Cham: Springer International Publishing.
- Livinus, H., & Akoh, S. R. (2025). Application of cost control techniques in construction projects delivery. *International Journal of Project Management*, 7(1), 23-45.
- Mansfield, N. R., Ugwu, O. O., & Doran, T. (1994). Causes of delay and cost overruns in Nigerian construction projects. *International journal of project Management*, 12(4), 254-260.
- Mukuka, M., Aigbavboa, C., & Thwala, W.

- (2015). Effects of construction projects schedule overruns: A case of the Gauteng Province, South Africa. *Procedia Manufacturing*, 3, 1690-1695.
- Mwando¹, S. M., Mooya, M. M., & Musvoto, E. (2024). A systematic review of locational decisions of property developers. In 23rd African Real Estate Society *Annual Conference Proceedings* (p. 159).
- Odum, C. O., Onyebueke, V. U., & Ibem, E. O. (2025). Social sustainability in public housing: insight from social network analysis of recent residential developments in Enugu, Nigeria. *Housing studies*, 40(11), 2307-2334.
- Okpala, D. C., & Aniekwu, A. N. (1988). Causes of high costs of construction in Nigeria. *Journal of Construction Engineering and Management*, 114(2), 233-244.
- Oluyemi-Ayibiowu, B. D., Aiyewalehinmi, O. E., & Omolayo, O. J. (2019). Most critical factors responsible for cost overruns in Nigeria building construction industry. *J. Multidiscip. Eng. Sci. Stud*, 5, 2500-2508.
- Rahman, I. A., Memon, A. H., Karim, A. A., & Tarmizi, A. (2013). Significant factors causing cost overruns in large construction projects in Malaysia. *Journal of Applied sciences*, 13(2), 286-293.
- Schoonenboom, J., & Johnson, R. B. (2017). How to construct a mixed methods research design. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 69(Suppl 2), 107-131.
- Shah, F. H., Bhatti, O. S., & Ahmed, S. (2023). A review of the effects of project management practices on cost overrun in construction projects. *Engineering Proceedings*, 44(1), 1.
- Subramani, T., Sruthi, P. S., & Kavitha, M. (2014). Causes of cost overrun in construction. *IOSR Journal of Engineering*, 4(6), 1-7.
- Subramani, T., Sruthi, P. S., & Kavitha, M. (2014). Causes of cost overrun in construction. *IOSR Journal of Engineering*, 4(6), 1-7.
- UN-HABITAT. (2024). *World cities report 2024: Cities and climate action*. Stylus Publishing, LLC
- Vařbuchta, P., & Hromádka, V. (2023). Index of Residential Development: Evaluation of the Possibility of New Residential Construction Depending on the City Plan. *Buildings*, 13(12), 3016.
- Zhao, C., & Liu, F. (2023). Impact of housing policies on the real estate market: A systematic literature review. *Heliyon*, 9(10) 1-14