Effect of Inadequate Structural Support on Building Renovation Costs in Enugu State, Nigeria

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The study examined the effect of Inadequate Structural Support on Building Renovation Costs in Enugu State, Nigeria. The specific objectives of the study were to examine the effect of Inadequate Infrastructure support on Building Renovation Costs in Enugu State, Nigeria. and evaluate the effect of structural weaknesses on Building Renovation Costs in Enugu State, Nigeria. A descriptive survey design was adopted for the study. Primary data were gathered using structural questionnaire design with a five-point Likert scale. The data were coded using SPSS version 28.0. The data were then analyzed and described using descriptive statistics, and multiple regression analysis was used to evaluate hypotheses. The result revealed that Inadequate Infrastructure Support has a significant positive effect on Building Renovation Costs with a p-value of (0.037 < 0.05) in Enugu State, Nigeria. Structural Weaknesses have a significant positive effect on Building Renovation Costs, with a p-value of (0.000 < 0.05) in Enugu State, Nigeria. The study concluded that Inadequate Structural Support has a significant positive effect on Building Renovation Costs in Enugu State, Nigeria. The study recommended that Planning authorities should set a structural integrity assessment (by registered structural engineers) as a prerequisite for renovation permits, especially for older buildings and multi-storey structures.

ABSTRACT

Keywords: *Inadequate Structural Support; Building Renovation Costs; Enugu State; Structural Weaknesses*

Introduction

Inadequate structural support is one of the most consequential but often under-acknowledged drivers of cost escalation in building renovation projects. In Enugu State, Nigeria, where a substantial proportion of residential, commercial, and public building stock is aging, intensifying in use, or being adapted for new functions, renovation has become a practical alternative to demolition and new construction. However, renovation projects routinely encounter hidden structural weaknesses: undersized or deteriorated members, inadequate foundations, distress from past alterations, corrosion of reinforcement, poor detailing, and substandard materials. Once these deficiencies are discovered (often after finishes are removed or loads are reassessed), the renovation scope typically expands from "upgrading" to "stabilizing and strengthening," with direct implications for time, risk, and cost. This study focuses on the effect of inadequate structural support on building renovation costs in Enugu State, Nigeria, recognizing that structural capacity is a core determinant of whether renovation remains economical or becomes financially disruptive.

Structurally, a building's ability to safely resist gravity loads, lateral loads (such as wind), and service loads depends on the adequacy of its foundation system, load paths, member sizing, connection detailing, and material performance over time. Inadequate structural support may therefore be conceptualized as a condition in which the structural system cannot reliably satisfy required strength, stability, and serviceability demands either because the original design or construction was deficient, the building has deteriorated, or imposed loads and usage have changed beyond what was initially intended. Guidance documents and professional standards emphasize that refurbishment and change-of-use projects frequently expose such inadequacies, requiring structural assessment and, where necessary, strengthening interventions to achieve safety and regulatory compliance (BSI, 2023; ASCE, 2022).

Renovation cost, in this context, extends beyond planned aesthetic improvements and functional upgrades to include investigation, temporary works, structural repairs, strengthening, re-design, rework, and risk allowances. When structural support is inadequate, renovation often demands additional work such as underpinning foundations, enlarging footings, adding reinforced concrete jackets, installing steel beams/columns, introducing shear walls or bracing, strengthening slabs with overlays or fiber-reinforced polymers, replacing corroded reinforcement, stitching cracks, or improving connections and load transfer. These interventions are typically expensive because they are labor-intensive, technically specialized, and complex to execute within occupied or constrained sites. They also trigger knock-on costs, extended project durations, increased professional fees, higher material and equipment costs, and greater contingency provisions due to uncertainty and safety risks (RICS, 2021; ICE, 2022).

In Enugu State, multiple contextual factors can intensify the relationship between inadequate structural support and renovation costs. First, many buildings have undergone incremental modifications, such as additional floors, mezzanines, roof changes, new water tanks, heavier finishes, or conversions from residential to commercial uses, without commensurate structural redesign or approval. Such changes can impose loads beyond the original structural capacity, leading to differential settlement, excessive deflection, cracking, and progressive deterioration that later must be corrected during renovation. Second, exposure-related deterioration, especially corrosion of reinforcement and moisture-related damage, can significantly reduce structural capacity and necessitate extensive repairs. Globally, corrosion is widely recognized as a significant cause of degradation in reinforced concrete infrastructure, with substantial economic implications for repair and rehabilitation (Gorzelańczyk & Hoła, 2023; Jin & Li, 2022). Third, weak documentation and limited "as-built" records for older buildings can make structural investigation more uncertain, increasing the likelihood of variations and claims once construction begins, an established source of cost growth in refurbishment projects (RICS, 2021).

Beyond technical deterioration, regulatory and safety expectations also shape renovation expenditure. Contemporary practice increasingly demands that existing buildings, particularly those undergoing significant alterations, demonstrate adequate reliability, robustness, and life-safety performance, often requiring engineers to reassess structural resistance using current codes and realistic loading scenarios. Where deficiencies are identified, compliance-driven strengthening becomes non-negotiable, adding unplanned costs but reducing long-term risk. The

rise in global attention to building safety, resilience, and risk-informed asset management reinforces the importance of structural adequacy as a precondition for sustainable renovation investment (ASCE, 2022; UNDRR, 2022).

Crucially, inadequate structural support affects renovation costs not only through the direct price of strengthening works, but also through the uncertainty it introduces into project planning. Renovation projects are inherently less predictable than new builds because the existing structure can conceal defects behind finishes and partitions. If early-stage structural diagnosis is limited by budget constraints, access restrictions, or insufficient testing, project teams may underestimate the required degree of strengthening. This leads to scope creep, variations, material price exposure during extended timelines, and disputes over responsibility for newly discovered defects. Cost overruns in refurbishment are therefore often linked to incomplete condition assessments and the late discovery of structural inadequacies (ICE, 2022; RICS, 2021). In Enugu State, where clients may be cost-sensitive, and procurement sometimes prioritizes the lowest initial price, the temptation to underinvest in structural investigation can amplify later cost shocks when deficiencies emerge on site.

Studying this issue in Enugu State is particularly valuable because renovation is increasingly central to urban development: upgrading aging public facilities, retrofitting commercial properties, improving housing quality, and adapting buildings to new functional and environmental demands. However, the cost consequences of structural inadequacy are not always captured systematically, making it difficult for clients, consultants, and policymakers to distinguish between normal renovation inflation and preventable cost escalation driven by weak structural capacity. By examining how inadequate structural support influences renovation costs through repair types, strengthening scope, duration impacts, and variation frequency, this research can provide evidence to improve early diagnosis, budgeting accuracy, and decision-making around repair-versus-replace options.

Ultimately, understanding the effect of inadequate structural support on renovation costs in Enugu State supports more realistic feasibility assessments, safer renovation outcomes, and better allocation of scarce resources. It encourages a shift toward proactive structural condition surveys, robust diagnostic testing, and design strategies that prioritize structural integrity before cosmetic upgrades. In doing so, the study contributes to safer buildings, reduced project risk, and more cost-effective renovation practices within the state.

Statement of the Problem

In Enugu State, Nigeria, building renovations are increasingly common, driven by the need to update aging structures and improve living standards. However, many of these buildings lack adequate structural support, a critical issue that often goes unnoticed until significant problems arise. This inadequacy can lead to severe structural weaknesses, posing safety risks and complicating renovation efforts.

The effect of inadequate structural support on building renovation costs is a pressing concern that requires thorough investigation. Preliminary observations suggest that buildings with insufficient support will incur significantly higher renovation costs due to the need for extensive repairs, reinforcement, and compliance with modern safety standards. These unexpected costs can strain financial resources, deter investment in property maintenance, and ultimately contribute to a cycle of neglect.

This study aims to explore the relationship between inadequate structural support and renovation costs in Enugu State. It will analyze how structural deficiencies influence the scope and scale of renovation projects, assess the additional financial burdens they impose, and provide practical recommendations for stakeholders in the construction and real estate sectors. The findings will be crucial for homeowners, contractors, and policymakers to prioritize structural integrity in building design and renovations, ultimately promoting safer and more cost-effective living environments.

Objective of the Study

The main objective of this study is to examine the effect of Inadequate Structural Support on Building Renovation Costs in Enugu State, Nigeria. The specific objectives of the study were to;

    i.   Examine the effect of Inadequate Infrastructure support on Building Renovation Costs in Enugu State, Nigeria.

    ii.   Evaluate the effect of structural weaknesses on Building Renovation Costs in Enugu State, Nigeria.

Hypotheses of the Study

    i.   Inadequate Infrastructure Support has no significant effect on Building Renovation Costs in Enugu State, Nigeria.

    ii.   Structural Weaknesses have no significant effect on Building Renovation Costs in Enugu State, Nigeria.

Review of Related Literature

Conceptual Review

Inadequate Structural Support

"Inadequate structural support" broadly refers to weaknesses in material, organizational, and systemic foundations. It involves both tangible and systemic issues. Authors describe structural support at three interconnected levels: (1) physical infrastructure such as classrooms, sanitation, water, electricity, furniture, and learning spaces; (2) institutional systems and asset management including maintenance, funding across the lifecycle, governance, and school administration; and (3) related pedagogical elements like laboratories, libraries, and instructional materials that underpin specific teaching methods. Inadequate structural support arises when these environmental conditions fail to meet the minimum standards necessary for effectiveness. Barrett (2019) emphasizes viewing the term through the lens of learning-environment design, highlighting that school buildings and classrooms are active factors influencing attention, health, and pedagogy. Thus, "structural support" should be understood as design elements that enhance learning processes.

Inadequate structural support encompasses overcrowded, unsafe, or poorly maintained buildings; a lack of furniture and learning materials; a lack of access to water and sanitation; or school designs that exclude learners with disabilities (Barrett, 2019). Addressing this issue requires actions across multiple levels: meeting basic physical standards (such as latrines, water, and safe classrooms), ensuring ongoing maintenance and asset management, incorporating inclusive design features, and aligning infrastructure planning with pedagogical objectives. "Inadequate structural support' goes beyond broken windows and missing desks; it is a systemic problem affecting health, pedagogy, equity, and governance. When absent, it leads to lower attendance, achievement, and inclusion; when properly designed, maintained, and integrated with other resources, it becomes a crucial factor in promoting learning (Andrade et al., 2024).

Inadequate Infrastructure Support

Infrastructure support involves providing and maintaining physical and service facilities essential for core institutional functions. It addresses concerns about the material and systemic foundations needed for effective operation. "Inadequate infrastructure support" refers to deficiencies, deterioration, or misalignment in the physical systems and enabling services on which societies rely, such as transport, energy, water and sanitation, healthcare, digital connectivity, and public buildings. Although each sector faces distinct challenges, inadequate infrastructure generally leads to service interruptions, reduced productivity, health and safety risks, social exclusion, and lower resilience to shocks (Foster, 2023). Inadequate infrastructure also leads to reduced productivity. Economists have demonstrated that infrastructure gaps hinder economic growth and increase inequality by raising transaction costs, diminishing firm productivity, and restricting market access (Foster, 2023).

Across different sectors, common pathways show how poor infrastructure causes adverse outcomes: service disruptions and lost time due to power and transport outages; reduced productivity because firms cannot operate

machinery or reach markets; health and safety risks from contaminated water or unsafe buildings; exclusion of remote communities, women, and disabled individuals; and weakening public trust and resilience, as infrastructure failures during crises increase vulnerability. These issues rarely occur in isolation; they spread across households, businesses, and public services (Foster, 2023; WHO, 2018). The literature consistently recommends that investments be strategic, targeting bottlenecks with high social returns, supported by robust maintenance and lifecycle funding (beyond one-off capital costs), and designed to promote inclusion and resilience (e.g., climate adaptation, accessible design, affordable digital access). While public-private collaborations and blended finance can attract investment, effective governance, transparency, and regulatory capacity are essential (Foster, 2023; OECD, 2021).

Structural Weaknesses

Structural weaknesses are inherent flaws or vulnerabilities in an economy or monetary union that threaten its stability and operation (Sustainability Directory, 2025). In development economics and public policy, these weaknesses are often seen as institutional or governance shortcomings that hinder policy implementation and economic transformation. The World Bank highlights structural weaknesses, such as uneven planning capacity, weak regulatory and implementation institutions, and poor coordination across government levels, as factors that consistently undermine reform efforts and public investments. "Structure" mainly refers to the rules, organizations, and fiscal arrangements that sustain public services (World Bank, 2016). These weaknesses can lead to significant economic instability within monetary unions, especially when some countries face recessions while others grow. Such issues often stem from an imbalance in economic performance (Reiljan et al., 2014).

A single structural weakness can lead to different outcomes across groups and establishments. Disparities in development levels among member states or inflexible labor markets diminish the effectiveness of a shared currency and centralized monetary policy. These vulnerabilities can induce tensions, with stronger nations potentially hesitating to provide financial assistance to weaker ones (Reiljan et al., 2014). Structural flaws also explain ongoing service-delivery issues despite sporadic investments, as the core rules, incentives, and asset-management systems remain inadequate. Proper diagnosis of these weaknesses requires a thorough analysis that incorporates fairness and local institutional capacity. Addressing them generally involves deeper economic integration among member states and often necessitates political negotiations to harmonize economic policies. Structural reforms rely on building coalitions, making credible commitments, and considering how distributional impacts influence sustainability (WHO, 2025).

Building Renovation Costs

'Building renovation costs' refer to the funds needed to alter, restore, upgrade, or repair an existing building to meet new safety, performance, or regulatory standards (RICS, 2024). This includes not only direct expenses for materials and labor but also soft costs (e.g., design, permits, and project management) and indirect costs (e.g., tenant disruptions and temporary works). Recurring lifecycle costs for maintenance and operation are also part of this, occurring after refurbishment decisions (RICS, 2018; Fahlstedt et al., 2024). According to professional standards, renovation costs are the sum of billable components, including demolition, repair, replacement, finishes, services, and site works, all priced in accordance with schedules of rates and estimating rules. Life-cycle cost analysis (LCCA) considers ongoing costs and benefits over time, guiding the selection of cost-effective renovation options, such as investing more upfront for lower operational expenses. Studies highlight the importance of discounting, addressing energy price uncertainties, and incorporating LCCA into municipal and portfolio renovation planning (Lu et al., 2023).

Renovation costs vary based on building type, current condition, local labor and material costs, and the scope of work, including envelope improvements, HVAC upgrades, and control systems. Accurate cost estimates demand detailed, project-specific data and scenario analysis (Cremer, 2022). Adaptive reuse, the process of converting existing buildings for new uses, also significantly influences renovation expenses. While it can be more cost-effective than demolition and new construction by avoiding demolition costs and using existing materials, hidden costs such as contamination, hazardous materials cleanup, and unforeseen structural repairs often introduce cost uncertainties and overruns (Vafaie et al., 2023). While adaptive reuse offers social and sustainability advantages, it remains difficult to accurately forecast costs early on without thorough inspections and contingency plans. Consequently, systematic cost benchmarking using standard elemental breakdowns and up-to-date local indices helps owners evaluate estimate accuracy and ensure that advisors are held accountable (RICS, 2018).

Theoretical Reviews

Dependency Theory

Dependency theory describes how global economic systems restrict local investment, shape infrastructure priorities, and sustain technological and financial dependence. It provides a critical political–economic perspective on persistent underdevelopment and structural issues in developing countries, including the long-standing infrastructure gaps noted by Prebisch in 1950 and expanded by Frank in 1967 (Hout, 2023). These scholars argued that peripheral economies primarily export primary commodities and import manufactured goods from core nations, resulting in unfavorable trade terms for the periphery and limiting domestic investment. Frank further emphasized that development and underdevelopment are interconnected aspects of a single historical process: the wealth of the core relies on the exploitation of the periphery (Kvangraven, 2023).

Inadequate infrastructure support naturally stems from these structural constraints. Building infrastructure requires long-term capital, technological expertise, and policy independence. Yet, dependent economies often remain trapped in export-focused systems that prioritize extractive industries and short-term foreign exchange earnings over developing domestic infrastructure. As a result, infrastructure investments tend to concentrate on export corridors such as ports and mineral transport routes, rather than on comprehensive national systems that promote industrialization and social welfare. By highlighting the structural root causes of infrastructure gaps, dependency theory challenges policies that solely focus on financial or technical solutions (Kumar, 2024).

Structural Functionalism Theory

Structural functionalism, a core sociological theory by Émile Durkheim, emphasizes social order, cohesion, and the role of institutions in maintaining collective stability. It explains the structure of societies, how social institutions function, and why problems occur when these institutions fail to perform their roles. Viewing society as a complex system of interconnected parts, the theory posits that stability, order, and persistence depend on the proper functioning of social structures (Imran & Shaleh, 2024). Durkheim believed that social structures exist because they perform vital functions essential to society's survival. Weaknesses in these structures arise when one or more subsystems fail to perform their roles, thereby weakening the whole system. According to this view, these weaknesses are not just isolated issues but systemic failures within institutional arrangements. Structural functionalism helps explain why such weaknesses endure even after reforms (Adeyanju et al, 2025).

Structural functionalism offers valuable insights into persistent institutional weaknesses and underscores the necessity for coordinated, system-wide reforms to reestablish social function and stability. It sees weaknesses as interruptions to the state's role in integrating society, which can lead to social tension and reduce overall system effectiveness. This perspective indicates that while policies or institutions may be designed to encourage growth, they can produce unintended adverse outcomes if coordination is poor or incentives are conflicting. The interconnectedness of social institutions and their functional requirements is crucial for preserving system stability (Nargiza, Zhao, & Fazal, 2023).

Empirical Reviews

Alli, Abdulrasheed, and Simiat (2019) conducted a study to investigate inadequate infrastructure facilities within a residential housing estate in the Oloje Area, Ilorin, Kwara State, Nigeria. The study aims to identify various residential properties within the estate, to examine the types of infrastructural facilities available within the estate, to examine the level and problems of inadequacy of infrastructural facilities within the estate, to assess the maintenance strategy put in place within the case study, and to proffer practical recommendations to the problems identified. The study used a questionnaire and secondary data from textbooks, theses, journal articles, and other academic sources. The results revealed that several factors contributed to inadequate infrastructure within the estate, including insufficient funding, a lack of maintenance culture, inadequate security, and insufficient or incompetent manpower.

Gnangnon (2022) conducted a study to investigate the effect of countries' structural economic vulnerability (EVI) on their participation in international trade. The study aims to estimate the effect of structural economic vulnerability (EVI) on countries' participation in international trade, test whether higher trade costs amplify or alter that effect,

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and test whether development aid mitigates the (adverse) effect of EVI on trade participation. The study employed an unbalanced panel dataset of 118 countries over the period from 1996 to 2018, and the two-step system generalized method of moments estimator. The results revealed that development aid helps mitigate the adverse effects of EVI on countries' participation in international trade. Moreover, this negative impact may prove beneficial for substantial levels of development aid.

Madu, Ogbo, and Tanimu (2023) examined how structural constraints, weak institutional capacity, and poor technical capabilities affect the rate of globalization in Nigeria, a developing economy. The study aims to identify and describe structural factors (political, economic, social, and cultural) that constrain decision-making at both the individual and institutional levels in Nigeria, and to assess the extent to which weak institutions and inadequate technical capacity hinder Nigeria's engagement in globalization processes. The study utilized both qualitative and descriptive research designs. The results revealed that the laid-down measures indicate that growth in African countries (Nigeria in particular) can be accelerated, and poverty is highlighted as a significant hindrance.

Okafor (2024) examined the adverse effects of infrastructure deficiencies on Nigeria's economic growth. The study aims to assess the state of infrastructure in Nigeria across critical sectors, evaluate how infrastructure deficiencies constrain economic growth, and identify key challenges and structural bottlenecks that prevent effective infrastructure development and maintenance. The study utilized secondary data from the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), and the World Bank reports. The results revealed that inadequate infrastructure, particularly in the power, transportation, and communication sectors, has stifled industrial productivity, increased operational costs, and limited access to markets.

Methodology

Study Area

Enugu State, located in the southeastern geopolitical zone of Nigeria, serves as the study area for this research. The state, created on 27th August 1991, has its capital in Enugu City—a major urban center known historically as the "Coal City" due to its coal mining heritage. Geographically, Enugu State lies between latitudes 6° 21' and 7° 12' North and longitudes 6° 24' and 7° 48' East, covering an approximate land area of 7,161 square kilometers. The state shares boundaries with Ebonyi State to the east, Benue State to the north, Kogi State to the west, and Anambra State to the south. Enugu State's built environment has expanded significantly over the past three decades, driven by rapid urbanization, demographic growth, and increased socio-economic activities. Enugu City, alongside other urban centers such as Nsukka, Agbani, and Awka-Etiti, exhibits a diverse mix of residential, commercial, institutional, and industrial structures. This expansion has triggered widespread building renovation and rehabilitation activities as property owners seek to modernize aging structures, comply with updated building standards, or repurpose facilities for new uses.

Despite these activities, many buildings across the state suffer challenges related to structural adequacy. Inadequate structural support stemming from poor design, substandard materials, insufficient adherence to engineering principles, and weak enforcement of building codes is a recurring issue. Such inadequacies often manifest as cracks, deflections, foundation settlement, and instability, which compromise building performance and safety. In the context of renovation, these structural defects significantly influence both the scope and cost of interventions. They may necessitate extensive remedial works, including reinforcement of load-bearing elements, underpinning, and structural retrofitting, all of which escalate renovation expenditure beyond initial projections.

Enugu State's regulatory framework, including the Town Planning and Development Laws and the Nigerian Building Code, provides standards for structural design and construction. However, enforcement remains uneven, particularly in peri-urban and informal settlements where professional oversight is limited. Consequently, many structures subject to renovation challenges fall outside strict regulatory compliance, making them prone to structural deficiencies. This study focuses on selected urban and peri-urban communities within Enugu State to examine the effect of inadequate structural support on building renovation costs. By situating the analysis within a context characterized by rapid urban expansion, varied construction quality, and evolving regulatory enforcement, the research aims to generate insights that are locally grounded yet relevant for broader applications in similar developing urban settings.

Method

The primary goal of a research design is to create a framework for data collection, analysis, and interpretation. The data and features of the target population will be detailed in this study using a descriptive survey design. This method aims to gather accurate, factual, and well-structured data while providing insights into the topics being studied. Considering the size of the population that the data comes from, it is especially beneficial. The study was carried out in a few integrity-driven private sectors in the southeast of Nigeria. The effect of Inadequate Structural Support on Building Renovation Costs in Enugu State, Nigeria was investigated in this study using a survey research design. Appropriate instruments were used for data collection, particularly questionnaires with a five-point Likert scale. In order to collect the primary data required to examine the correlations between variables, the survey was essential. After being coded, the gathered data were loaded into SPSS for examination. The data were modified and coded to guarantee the correct recording of pertinent characteristics. The data were then analyzed and described using descriptive statistics, and multiple regression analysis was used to evaluate hypotheses. Regression statistical measurements were deemed acceptable and significant if they were below the $\alpha = 0.05$ significance level.

Data Presentation and Analysis

Data Presentation

There were 236 people in the study's population. A total of 180 surveys were completed and returned, yielding an acceptable return rate of 76.3%. To assess the data, descriptive and correlational techniques were used. Cronbach's alpha for a pilot test of 36 surveys was 0.775, indicating a reasonable degree of reliability. The tables below display the findings.

Results

Gender of Respondents

The table below illustrates that there were more females than males in the research population.

Table 1: Gender Distribution of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	107	59.4	59.4	59.4
	Female	73	40.6	40.6	100.0
	Total	180	100.0	100.0	

Table 2: Age Distribution of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 21 years	8	4.4	4.4	4.4
	21-30 years	109	60.6	60.6	65.0
	31-40 years	49	27.2	27.2	92.2
	Above 40 years	14	7.8	7.8	100.0
	Total	180	100.0	100.0	

Table 3: Distribution of Respondents' Location

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban	117	65.0	65.4	65.4
	Local	62	34.4	34.6	100.0
	Total	179	99.4	100.0	
Missing	System	1	.6		

Total	180	100.0		

Table 4: Distribution of Respondents' Educational Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below High School	6	3.3	3.3	3.3
	High School Graduate	31	17.2	17.2	20.6
	University Degree	131	72.8	72.8	93.3
	Master's or Higher	12	6.7	6.7	100.0
	Total	180	100.0	100.0	

The respondents' demographic information, such as gender, age, location, and educational background, is shown in Table 2-5. According to the data, the majority of respondents roughly 107 people, or 59% are men. With about 109 responders (61%), the greatest age group is between 21 and 30 years old. Geographically speaking, 117 people (65%) of the sample come from metropolitan locations, making up the majority of participants. Finally, in terms of educational background, 131 respondents (72.8%) had a university degree, which is a significant percentage.
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Multiple Regression Analysis

Table 5: Multiple Regression Table

Model 1	Beta	Std. Error	t-Statistic	P-value
Inadequate Infrastructure Support (IIS)	0.71145	0.41319	1.72184	0.031
Structural Weaknesses (SW)	0.22714	0.03241	7.00833	0.000
Constant	2.90181	0.11028	26.3131	0.000
Adj R^2	0.698			

Source: SPSS version 28.0

The outcomes of the multiple regression analysis for hypotheses one and two are shown in Table 5 above. This analysis, which was carried out at a 5% significance level, shows that every predictor variable has a substantial impact on the outcome variables. The following hypothesis has more information.

Hypotheses of the Study

Hypothesis One

H$_{01}$: Inadequate Infrastructure Support has no significant effect on Building Renovation Costs in Enugu State, Nigeria

Regression Model of Hypothesis 1
Below is the equation for a model for Hypothesis 1
$$\mathbf{BRC = \beta_0 + \beta_1 IIS + \varepsilon_i} \qquad (1)$$
BRC= Building Renovation Costs
IIS = Inadequate Infrastructure Support

Table 6: Regression Coefficient for Model 1

Model 1	Beta	Std. Error	t-Statistic	P-value
Inadequate Infrastructure Support	0.71199	0.41319	1.72315	0.037
Constant	2.90181	0.11028	26.3131	0.000
Adj R^2	0.698			

Source: SPSS version 28.0

The modified R Square, unstandardized beta coefficient, standard error, t value, and P value are displayed in Table 6. The modified R-squared value is 0.698, which indicates that Inadequate Infrastructure Support (IIS) accounts for

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69.8% of the variation in Building Renovation Costs (BRC), with the remaining variation in BRC being unaccounted for by variables not included in this model. Additionally, the unstandardized beta coefficient is 0.71199, meaning that for every unit rise in Inadequate Infrastructure Support (IIS), Building Renovation Costs (BRC) will also increase by 0.71199 units. With a 95% confidence interval of less than 0.05 and a p-value of =0.037, this effect is statistically significant. Thus, it can be concluded that Inadequate Infrastructure Support (IIS) has a major impact on Building Renovation Costs (BRC) in Nigeria and that the null hypothesis is rejected.

Hypothesis Two

H_{01}: *Structural Weaknesses have no significant effect on Building Renovation Costs in Enugu State, Nigeria.*

Regression Model of Hypothesis 2

Below is the equation for a model for Hypothesis 2
$$\mathbf{BRC} = \mathbf{\beta_0} + \mathbf{\beta_1 SW} + \mathbf{\varepsilon_i} \qquad (2)$$
BRC= Building Renovation Costs
SW = Structural Weaknesses

Table 7: Regression Coefficient for Model 2

Model 1	Beta	Std. Error	t-Statistic	P-value
Structural Weaknesses (SW)	0.22714	0.03241	7.00833	0.000
Constant	2.90181	0.11028	26.3131	0.000
Adj R^2	0.698			

Source: SPSS version 28.0

The modified R-squared, unstandardized beta coefficient, standard error, t value, and P value are displayed in Table 7. The corrected R-squared value is 0.698, which indicates that Structural Weaknesses (SW) accounts for 69.8% of the variation in Building Renovation Costs (BRC), with the remaining variation in BRC being unaccounted for by factors not included in this model. Furthermore, the unstandardized beta coefficient is 0.22714, meaning that for every unit rise in Structural Weaknesses (SW), Building Renovation Costs (BRC) will also grow by 0.22714 units. Given that the p-value is less than 0.000, or less than 0.05 at a 95% confidence range, this effect is statistically significant. Thus, it can be concluded that Structural Weaknesses (SW) have a major impact on Building Renovation Costs (BRC) in Nigeria and that the null hypothesis is rejected.

Discussion of Findings

The study examined the effect of Inadequate Structural Support on Building Renovation Costs in Enugu State, Nigeria. The Cronbach's alpha of 0.775 shows that the items used were accurate in measuring the factors we chose. According to the multiple linear regression results in Tables 6 and 7, the Inadequate Infrastructure support has a statistically significant effect on Building Renovation Costs in Nigeria, at a 5% level of significance for hypothesis one. In contrast, the Structural Weaknesses have a statistically significant impact on Building Renovation Costs at the 5% level of significance, according to hypothesis two. Their individual p-values, which fall below the < 0.05 cutoff, provide the basis for this conclusion.

Conclusion

In conclusion, the findings from Enugu State, Nigeria, show that inadequate structural support is a major driver of rising building renovation costs, largely because renovation efforts are forced to go beyond surface upgrades into corrective, safety-focused interventions. Where buildings were initially delivered with weak structural provisions or where structural performance has been compromised over time, renovation projects typically expand in scope, require more specialized input, and demand higher-quality materials and workmanship. This pushes costs upward and makes renovation budgets harder to predict or control.

The results further indicate that inadequate infrastructure support has a significant positive effect on building renovation costs in Enugu State. In practical terms, deficiencies in supporting infrastructure such as poor drainage

systems, unstable access roads, unreliable water supply, and inconsistent power create conditions that accelerate building deterioration and complicate renovation work. Contractors may face delays, higher logistics expenses, additional protective works, and repeated repairs to address infrastructure-induced damage (e.g., erosion, dampness, and flooding impacts), all of which inflate total renovation costs.

In the same vein, structural weaknesses have a significant positive effect on building renovation costs. Structural defects, cracks, settlement, weakened columns and beams, failing foundations, or corroded reinforcements often require technical assessment, design recalculations, and reinforced interventions (such as underpinning, retrofitting, or partial reconstruction). These are inherently more expensive than cosmetic refurbishments and can also introduce hidden costs when defects are discovered mid-project. Overall, the evidence suggests that controlling renovation costs in Enugu State requires more than improved finishes or routine repairs; it calls for an approach that prioritizes sound structural systems and supportive infrastructure as foundational investments. The study concluded that Inadequate Structural Support has a significant positive effect on Building Renovation Costs in Enugu State, Nigeria.

Recommendations

Given the evidence that inadequate structural support increases building renovation costs in Enugu State, and that both inadequate infrastructure support and structural weaknesses have significant positive effects on renovation costs, the following recommendations are proposed to reduce cost overruns, improve project predictability, and enhance safety and durability.

i. Planning authorities should set a structural integrity assessment (by registered structural engineers) as a prerequisite for renovation permits, especially for older buildings and multi-storey structures. And standardize the use of condition surveys (crack mapping, deflection checks, rebound hammer tests where applicable) to identify hidden weaknesses early and prevent "surprise" costs mid-project.

ii. Planning authorities should intensify on-site inspections to ensure structural repairs and retrofit works meet minimum standards, not just aesthetic requirements, and enforce penalties for substandard materials and unqualified workmanship, since these are common pathways through which structural problems reappear and raise long-term renovation costs.

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