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Research Article

Role of Owner-Occupier Needs-Expectations in Optimizing Building Design and Re-Design Costs in Enugu Metropolis

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Abstract

The study examined the role of Owner-Occupier Needs-Expectations in Optimizing Building Design and Redesign Costs in Enugu Metropolis. The specific objectives of the study were to examine the effect of Space Utilization in Optimizing Building Design and Redesign Costs in Enugu Metropolis. And evaluate the effect of Operational Costs in Optimizing Building Design and Redesign Costs in Enugu Metropolis. The study adopted a descriptive research design. Structure questionnaire design with a four-point Likert scale was used to collect data for the study. The data was analyzed using Smart PLS version 4.0. The result revealed that Space Utilization has a significant positive effect on Optimizing Building Design and Redesign Costs in Enugu Metropolis. While Operational Costs have no significant effect on Optimizing Building Design and Redesign Costs in Enugu Metropolis. The study concluded that owner-occupier needs and expectations play a decisive role in how effectively building design and redesign costs are optimized in Enugu Metropolis. The study recommended that Building construction companies should facilitate regular consultations with owner-occupiers to gather insights on their specific needs and expectations. Conduct surveys and focus groups to understand preferences related to space, functionality, and overall experience in the built environment.

Keywords	*Optimizing Building Design; Re-Design Costs; Enugu Metropolis; Owner-Occupier Needs; Owner-Occupier Expectations*
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Introduction

Owner-occupiers, individuals or institutions that commission, finance, and ultimately live in or directly use a building, play an unusually decisive role in the cost efficiency of building design and redesign. Unlike speculative developers, owner-occupiers carry the long-term consequences of design decisions: operational expenses, maintenance burdens, comfort, adaptability, and the social status attached to the property. In Enugu Metropolis, where residential self-build and client-driven commercial projects remain prominent, many projects evolve through iterative design changes during planning or construction, and later through renovations and extensions as household size, income, technology, or land-use pressures change. Within this context, understanding owner-occupier needs and expectations is not merely a "user satisfaction" issue; it is a cost-optimization problem. When needs and expectations are accurately captured early and translated into coherent design requirements, redesign frequency reduces, cost certainty improves, and life-cycle value increases. Conversely, when expectations are vague, shifting, or poorly communicated, design teams face scope creep, abortive design work, rework on site, and avoidable variations, each of which increases both direct costs and time-related costs (RIBA, 2020; PMI, 2021).

Conceptually, *needs* refer to essential functional and performance requirements—space adequacy, safety, privacy, ventilation, durability, accessibility, and basic services—while *expectations* encompass aspirations and preferences such as aesthetics, prestige, smart-home features, sustainability performance, premium finishes, and future expansion potential. These two categories overlap but differ in how they affect design risk: unmet needs can cause functional failure and costly corrective works, whereas unmanaged expectations can trigger repeated changes, upgrades, and specification inflation that disrupt budgets. Client requirements management literature consistently notes that poorly defined requirements are a leading source of cost overruns and schedule delays because late changes are more expensive to implement than early-stage decisions (PMI, 2021; Love, Matthews, Simpson, Hill, & Olatunji, 2022). This principle is especially relevant in owner-occupied projects where the client's personal identity, family dynamics, and plans shape the brief and may shift as the project progresses.

In Enugu Metropolis, optimizing building design and redesign costs has become increasingly important due to economic and market conditions that expose projects to price volatility in cement, steel, finishes, and imported components, as well as fluctuating exchange rates and inflation. Under such conditions, late-stage redesign and change orders can be financially punitive: they can require demolition and rebuilding, re-procurement of materials, repeated approvals, and extended preliminaries (site overheads). The cost impact of changes tends to be nonlinear—small changes late in the project can have outsized cost effects because they cascade across structure, services, finishes, and procurement schedules. Contemporary project management guidance emphasizes structured change control and front-end planning as primary strategies for improving cost performance (PMI, 2021; Flyvbjerg, 2021). In building projects where owner-occupiers are the primary decision-makers, these strategies heavily depend on how well user needs and expectations are elicited, negotiated, and incorporated into a realistic scope.

The role of owner-occupier needs and expectations is also central to *value optimization*. Value is not simply "lowest capital cost"; it is the relationship between performance (function, quality, longevity, adaptability) and whole-life cost (design, construction, operation, maintenance, replacement, and end-of-life). Standards and guidance on value management and briefing argue that early clarification of what the client values most is the foundation for aligning design choices with cost limits while avoiding false economies such as cheap materials that create high maintenance costs later (ISO, 2020; RIBA, 2020). For owner-occupiers in Enugu, this is particularly significant because building ownership is often long-term and intergenerational; decisions about plan layout, serviceability, durability, and expandability affect not only present-day affordability but also future renovation needs and costs.

Statement of the Problem

The Enugu Metropolis is experiencing a dynamic shift in urban development, driven by increasing population density, changing economic conditions, and evolving societal norms regarding living and working environments. Despite these developments, there is a critical gap in the understanding of how owner-occupier needs and expectations affect the optimization of building design and redesign costs.

Current architectural practices often focus on structural efficiency and aesthetic value, frequently overlooking the specific requirements and preferences of owner-occupiers. This oversight can lead to inefficiencies in building

design, resulting in projects that do not fully meet the functional and emotional needs of residents, ultimately inflating redesign costs and timelines.

Moreover, the lack of comprehensive data on owner-occupier preferences leads to suboptimal allocations of resources, exacerbating financial strain on both developers and future occupants. Thus, it is imperative to investigate the influence of owner-occupier needs and expectations on design decisions to develop a framework that optimizes building design and reduces redesign costs.

Objective of the Study

The main objective of the study is to examine the role of Owner-Occupier Needs-Expectations in Optimizing Building Design and Redesign Costs in Enugu Metropolis. The specific objectives of the study were to;

i. Examine the effect of Space Utilization in Optimizing Building Design and Redesign Costs in Enugu Metropolis.
ii. Evaluate the effect of Operational Costs in Optimizing Building Design and Redesign Costs in Enugu Metropolis.

Hypotheses of the Study

i. Space Utilization has no significant effect on Optimizing Building Design and Redesign Costs in Enugu Metropolis.
ii. Operational Costs have no significant effect on Optimizing Building Design and Redesign Costs in Enugu Metropolis.

Review of Related Literature

Conceptual Reviews

Space Utilization

Space is defined as a segment of a facility that can be either usable or non-usable. Abdullah et al. (2015) describe space utilization as a means to assess the performance of space management systems. It is typically viewed within the broader context of space management, which includes allocation, auditing, and strategic planning to maximize resource use (Abdullah et al., 2015). In this context, utilization is one element within a larger management framework aimed at aligning physical space with organizational goals and outcomes. Space utilization measures how space within a building is actually used. Nik et al. (2015) note that space utilization is a complex, multi-dimensional concept that combines quantitative metrics, functional analysis, and behavioral insights. While facilities management often operationalizes utilization via occupancy and usage rates for planning purposes, architectural and organizational perspectives highlight that utilization is influenced by spatial arrangement, human behavior, and socio-cultural norms.

Office space utilization, as defined by Woolf (2016), is the number of people using a specific space in a building. The goal of measuring this ratio is to understand current and potential future use (Best, 2017). The utilization rate relates to how frequently and how long spaces are used, as well as occupancy rates, which compare actual use to available space. Post-occupancy evaluation (POE) assesses how well spaces meet occupants' needs, identifying usage patterns and guiding improvements for adaptability, efficiency, and satisfaction (Mustafa, 2017). Additionally, space utilization is a key factor in evaluating HVAC system performance, indoor environmental quality (IEQ), and overall building energy consumption (Jung and Jazizadeh, 2019). However, quantifying energy savings based on occupant behavior remains challenging. According to Peppin (2025), space utilization is the effective and efficient use of physical space, involving the analysis and optimization of how each square foot of a workspace is used. It refers to how physical areas are allocated and occupied over time to support organizational goals.

Operational Costs

Cost encompasses all charges related to producing goods and services intended for sale to generate revenue. According to Werner Murhadi (2013), operating costs are expenses linked to company operations, including selling, administrative expenses, advertising, depreciation, amortization, and repairs and maintenance. Feinberg and Zanardi (2015) define operating costs or business expenses as costs not directly tied to the company's products but associated with daily business activities. These recurring expenses, split into direct and indirect costs and further categorized as fixed or variable (Gubata, 2021), cover nearly all expenditures except financing costs (interest), income tax, and depreciation. Operational costs form a substantial part of organizational expenses, directly influencing overall performance and competitiveness. Managing these costs effectively is crucial for organizations seeking to improve efficiency and maintain profitability in a competitive, dynamic environment (Hossain and Hasan, 2024). In accounting, operating costs are described as daily expenses necessary for maintaining, running, and managing a business, including the cost of goods sold (COGS) and other operational expenses (Velasquez, 2025). Managerial accounting strategies are vital for improving the efficiency and effectiveness of operational costs through precise cost allocation, detailed budgeting and variance analysis, comprehensive performance measurement, and enhanced cost transparency enabled by advanced information technology (Khomenko and Tsyhan, 2025). These costs include the cost of goods sold, selling expenses, and general and administrative costs such as rent and insurance.

Optimizing Building Design and Redesign Costs

Optimizing building design and redesign costs is a complex challenge that involves cost planning, life-cycle assessment, digital technologies, and decision-making tools. The term "optimization" does not just mean lowering costs but finding the best balance among cost, functionality, sustainability, and stakeholder needs (ElSahly et al., 2023). As Zhang and Mo (2024) explain, "Design optimization" in buildings means systematically adjusting design variables to minimize costs while achieving performance goals, often using computational algorithms like genetic algorithms or evolutionary computation, or integrated models such as BIM-based frameworks. Incorporating Building Information Modeling (BIM) is transforming cost-effective design by enabling real-time cost estimation, clash detection, and integration of cost data throughout the lifecycle reducing waste, rework, and unexpected expenses. Building design optimization involves exploring and selecting solutions that best meet multiple objectives like energy efficiency, occupant comfort, environmental sustainability, and cost-effectiveness through analytical and computational methods (Li et al., 2025). Optimization applies not only to new buildings but also to redesigns, retrofits, and lifecycle upgrades. Redesign cost optimization aims to systematically reduce and control costs during modifications of existing designs while maintaining or improving performance, functionality, and value. Essentially, it involves identifying cost-effective alternatives that minimize expenses while satisfying target performance criteria (Relich, Nielsen, and Gola, 2022).

Theoretical Review

Theory of Housing Satisfaction

G. C. Galster and G. W. Hesser were pioneers of this theory, defining living satisfaction to assess how individuals or households view the alignment of their current situation with their ideal life and future hopes. Their perspective links satisfaction or dissatisfaction with housing directly to the present circumstances and the need for permanent changes. Studies on housing satisfaction mainly analyze the dwelling itself and its neighborhood, but defining the neighborhood is complex due to the lack of clear geographic boundaries. It largely depends on an individual's perception and identification with the space (Amerigo & Aragones, 2017). Consequently, neighborhood perception is subjective. Housing satisfaction is influenced by three key factors: the household's objective characteristics, the physical features of the housing environment, and subjective well-being shaped by personal perceptions, values, and aspirations (Galster, 2017; Diaz-Serrano, 2018). Objective features include aspects like the size of the dwelling, number of rooms, and layout, while external features encompass access to the property, parking availability, proximity to amenities, green spaces, and social services. Nearly all authors emphasize that subjective housing satisfaction varies among households and across different life stages. Charlotte Büchler's theory of human developmental psychology could complement this, recognizing that housing needs change at various life stages

whether during peak periods, decline, or feelings of failure. If dissatisfaction arises at any stage, there may be a need to alter housing features or pursue different housing opportunities.

This aspect of housing satisfaction aligns with Morris's theory of housing adjustment, which also stems from housing discontent and is rooted in cultural standards of living, contrasting with the broader focus on housing attributes that directly influence individual or family satisfaction. Here, neighborhood and environmental factors serve as secondary indicators of achievement, but may prove crucial lower satisfaction often leads to relocating to a different residence or type of housing. Diaz-Serrano's research (2018) found that satisfaction tends to increase when individuals move into better, more attractive homes, while M. Lu (2019) reported no significant or short-term change following relocation. These findings highlight that housing satisfaction is a subjective, variable measure that varies across demographic groups. Future research on housing satisfaction is likely to remain relevant across disciplines from psychology to geography because many professions intersect with housing dimensions affecting quality of life. These foundational ideas underpin the development of housing adjustment theories, notably those by E. W. Morris and M. Winter.

Empirical Review

Nik et al. (2015) conducted a study titled Office Space: A Review from the Facilities Management Context. The study aimed to review space studies in the facilities management context and to identify potential research opportunities in this area. A comprehensive literature review was conducted to gather existing knowledge on office space management and utilization. The results show that office space studies can be divided into space management, space utilization, and space efficiency.

Geekiyanage and Ramachandra (2018) conducted a study on the significant factors influencing operational and maintenance (O&M) costs of commercial buildings. The study aimed to investigate the factors that influence the running costs (operational and maintenance costs) of commercial buildings in Sri Lanka. A questionnaire survey was administered to a sample of 125 industry professionals. The results revealed that Operational & Maintenance costs of a commercial building are influenced by 08 major determinants, including building characteristics (BC) and maintenance factors (MTF).

A study on Managerial Accounting Strategies to Increase Operational Cost Effectiveness and Efficiency was carried out by Efendi et al. (2025). The study's objectives were to identify important managerial accounting techniques, examine how they enhance operational efficacy and efficiency, and discuss the consequences for managerial practice. Utilizing a qualitative methodology by doing library research and a thorough literature evaluation. The results show that cutting waste, increasing resource allocation, and boosting overall financial performance are all greatly aided by combining strategic management accounting techniques with operational activities.

Gao et al (2025) examined a novel paradigm for space utilization assessment from the standpoint of post-occupancy evaluation using Bluetooth and Wi-Fi locating technologies. The study aims to utilize Wi-Fi and Bluetooth positioning systems for real-time tracking of space utilization and to improve the granularity and accuracy of data on how spaces are used by occupants. The quantitative data were examined using statistical analysis, user surveys, and interviews. The study revealed distinct patterns in space utilization, such as peak usage times and areas with the highest foot traffic.

Methodology

Study Area

The focus of this study is Enugu Metropolis, the capital and largest urban center of Enugu State, located in the southeastern region of Nigeria. Geographically, Enugu Metropolis lies roughly between latitudes 6°25′ and 6°30′ North and longitudes 7°25′ and 7°30′ East, covering a significant portion of the state's urbanized landscape. As a historic colonial administrative center and contemporary hub of governance, commerce, education, and services, Enugu has experienced sustained population growth, rapid urbanization, and extensive development of residential, commercial, institutional, and mixed-use buildings. Enugu's built environment is shaped by its socio-economic dynamics, which include a growing middle class, expanding professional workforce, and active public and private sectors. This has led to increased demand for both new buildings and modifications of existing structures to reflect evolving functional requirements, lifestyle expectations, and environmental conditions. Crucially, owner-occupiers individuals and organizations that both own and occupy buildings—play a central role in determining design preferences, project objectives, and resource allocation decisions that affect the performance and cost profile of the built asset.

In Enugu Metropolis, owner-occupiers range from private homeowners and corporate entities to government agencies and institutional bodies, each with distinct needs and expectations informed by factors such as cultural preferences, financial capacity, anticipated use patterns, comfort requirements, aesthetic values, and long-term sustainability considerations. These owner-occupier requirements profoundly influence the building design and redesign process, especially in contexts where formalized design briefs are weak, decision-making relies heavily on subjective preferences, and professional engagement varies in depth.

Research and anecdotal evidence from the metropolis indicate that inadequate alignment between owner-occupier needs and building design outcomes often leads to design iterations, scope changes during construction, and post-construction alterations. Such discrepancies can escalate design and redesign costs, compromise functional efficiency, and diminish building longevity and user satisfaction. For instance, under-specified spatial layouts, mismatches between intended use and actual layout, inadequate provision for natural ventilation and lighting, or failure to anticipate future expansion needs are common concerns reported by owner-occupiers in residential, commercial, and institutional buildings within Enugu.

The climate of Enugu with its tropical wet and dry seasons, high humidity, and periodic intense rainfall also interacts with design decisions, often requiring careful consideration in the planning and detailing of building elements. When owner-occupier expectations do not adequately consider these climatic factors, buildings may require design modifications that further increase costs and maintenance demands. Furthermore, institutional frameworks for building regulation, planning approvals, and professional oversight in Enugu are evolving, and the degree of owner-occupier engagement in the design process varies widely across project types and scales.

This study therefore situates its investigation within the urban milieu of Enugu Metropolis as a representative environment where owner-occupier needs and expectations interact dynamically with building design processes and cost outcomes. By focusing on this metropolitan context—with its diverse building stock, complex socio-economic drivers, and active owner-occupier participation—the research aims to elucidate the role of owner-occupier expectations in optimizing design and redesign costs, offering insights that are not only locally grounded but also relevant to similar rapidly urbanizing centers in Nigeria and beyond.

Methods

The population of this study was the staff of some selected public sector institutions in Nigeria. Sampling used a purposive sampling technique. The sample size was collected for 217, with consideration of the statistical adequacy of the sample to get 0.8 power with 0.05 alpha. Out of 217 respondents (comprising the staff of the selected public sector to whom the research questionnaire was distributed, only 168 pieces of the questionnaire were returned to the researchers. This means that the respondents' response rate is 77.4%. The remaining 22.6% was not feasible to use because there were some question items that were left empty or were not answered by the respondents (missing value). So, the number of questionnaires analyzed in this study was 168.

Table 1 shows a summary of the demographic characteristics of the respondents to provide information about the age of respondents, gender of the respondents, educational qualification, professional role, and years of working experience as considered for this study. Additionally, in this study, we tested the conceptual underpinnings of the hypothesis using Smart PLS version 4.0. The analysis was presented transparently and systematically, allowing for comprehension of the conceptual framework and results.

Table 1: Sample Characteristics

Variable	*Category*	*Frequency*	*Percent*
Gender	Male	112	66.7%
	Female	56	33.3%
Age(yrs.)	<25yrs	27	16.1%
	25-34yrs	61	36.3%
	35-44yrs	51	30.4%
	>45yrs	29	17.3%
Educational Qualification			
	NCE/OND	47	27.9%
	B.Sc	84	50%
	MSc/MBA	37	22.1%
Professional Role			
		33	19.6%
		93	55.4%
		42	25%
Experience (yrs)			
	1-09yrs	71	42.3%
	10-19yrs	45	26.8%
	20-29yrs	32	19%
	30yrs>	20	11.9%

Measurement

Measurements in the study used a 4-point Likert scale, ranging from High (4) to Moderate (3) to No (1). The 4-point Likert scale was used because it was easy to respond to and required less time to consider when compared to open-ended questions. To measure the variables of Owner-Occupier Needs-Expectations, the following proxies were used: Space Utilization and Operational Costs, while Cost Estimation Methods, Cube Method, and Superficial Area Method are proxies used to measure Optimizing Building Design and Redesign Costs.

Result and Discussion

The research used PLS-SEM based on primary data collected to find out a direct relationship between the Owner-Occupier Needs-Expectations and optimizing building design and Redesign Costs in Enugu Metropolis. SmartPLS 4.0 was used to analyze structural equation models. Measurement of the model through an algorithm to explain the variance of the dependent construct. In the first step, the construction score was estimated. Then the final estimation from external loading was also calculated as the structural model of the path coefficient, which results in the R-Squared value of the endogenous latent variable.

Table 2: Validity and Reliability Test

Latent Variables	*Cronbach's Alpha*	*rho_A*	*Composite reliability*	*Average variance extracted (AVE)*
Space Utilization	0.733	0.701	0.831	0.622
Operational Costs	0.787	0.787	0.859	0.604
Building Design and Redesign Costs	0.734	0.739	0.827	0.618

Three primary findings are provided by Smart PLS: latent variable R-Squared values, path coefficients for the structural model, and outer loadings for the measurement model. Additionally, the reliability of individual indicators, the average extracted variance, and the composite reliability of internal consistency testing are all considered in the assessment of the measurement.

In order to determine whether a construct is valid and reliable, hypothesis testing examines the structural relationships between the constructs. Since the Cronbach alpha, or composite reliability, value is larger than 0.7, the result is considered high quality and reliable. When the reliability test yields a result larger than 0.7, it indicates that the value is high and satisfactory. To establish convergent validity, look at the AVE. In Table 2, it can be seen that the AVE value is greater than 0.5, which means that the results are acceptable.

To evaluate the discriminant validity of the 3-variables used in the study, Heterotrait-and Monotrait (HTMT) was used in Table 3, analysis was executed, and the Fornell-Larcker criterion was examined in Table 4.

Model Assessment

Table 3: Heterotrait-Monotrait Ratio (HTMT)

S/N		
		Heterotrait-Monotraiat ratio
1	Space Utilization <-> Building Design and Redesign Costs	0.567
2	Operational Costs <-> Building Design and Redesign Costs	0.419

Table 4: Fornell-Larcker Criterion

	Design and implementation of public construction reform.	*Institutional Factor*	*Construction Factor*
Design and implementation of public construction reform.	0.756		
Institutional Factor	0.623	0.771	
Construction Factor	0.234	0.355	0.419

The confirmatory factor analysis's findings, which are presented in Table 3, support the empirical evidence for the majority of the variables' uniqueness. It is important to note that the aforementioned table does not show discriminant validity issues by the $HTMT_{0.85}$ criterion. This suggests that collinearity issues between latent constructs were not detected by the HTMT criteria.

Table 5: Factor loadings of the Measurement Items

	Space Utilization	*Operational Costs*	*Building Design and Redesign Costs*
SU1	0.648		
SU2	0.867		
SU3	0.827		
OC1		0.771	
OC2		0.787	
OC3		0.809	
OC4		0.740	
BDRC1			0.754
BDRC2			0.838
BDRC3			0.773

Structural Equation Modelling

In Smart-PLS, the measurement model and structural model are often the first two stages used to observe the impact of predictor variables on the outcome variable. A few of the criteria, such as construct validity and dependability, have already been covered. In addition to that, in the structural modelling equation, R square also shown for the predictive ability of predictor variables on the outcome variables. The value of R-Squared for the model is 0.497 indicates that 49.7% variation in the Building Design and Redesign Costs in Enugu Metropolis is caused by Space Utilization and Operational Costs.

The model fit was tested for the model using the SRMR value, which is 0.028, respectively. This means that the model is a good fit.

Table 6: The Role of Owner-Occupier Needs-Expectations in Optimizing Building Design and Redesign Costs in Enugu Metropolis

	Original sample (O)	*Sample mean (M)*	*Standard Deviation (STDEV)*	*T-statistics (|O/STDEV|)*	*P values*
Space Utilization <-> Building Design and Redesign Costs in Enugu Metropolis.	0.686	0.683	0.084	8.193	0.000
Operational Costs <-> Building Design and Redesign Costs in Enugu Metropolis.	-0.009	0.020	0.081	0.106	0.916

Summary of Findings

The study aimed at identifying the effect of the role of Owner-Occupier Needs-Expectations in Optimizing Building Design and Redesign Costs in Enugu Metropolis. The result of HTMT in Table 3 indicates that the variables are correlated; however, there was no presence of multicollinearity within the variables. Table 6 indicates that at 5% level of significance, there is a statistically significant positive effect of Space Utilization on the Building Design and Redesign Costs in Enugu Metropolis. Also, the results indicate that the Operational Costs have no statistically significant effect on the Building Design and Redesign Costs in Enugu Metropolis.

Hypothesis

1. Space Utilization has no significant effect on Optimizing Building Design and Redesign Costs in Enugu Metropolis.
   [β=0.686; T-Statistic = 8.193; P values < 0.001]
   [R-Squared = 0.497 (49.7%); SMRM = 0.0028 <0.1]

2. Operational Costs have no significant effect on Optimizing Building Design and Redesign Costs in Enugu Metropolis.

[β=-0.009; T-Statistic = 0.106; P values = 0.916]
[R-Squared = 0.497 (49.7%); SMRM = 0.0028 <0.1]

Conclusion

In conclusion, the study highlights that owner-occupier needs and expectations play a decisive role in how effectively building design and redesign costs are optimized in Enugu Metropolis. When the people who live in and use the building are treated as central stakeholders, not an afterthought, design decisions tend to be more targeted, fewer changes are required after construction, and redesign efforts become more purposeful rather than corrective. In this sense, optimization is achieved less by cutting corners and more by aligning the building's form and layout with real-day-to-day use.

The results also show that space utilization has a significant positive effect on optimizing building design and redesign costs in Enugu Metropolis. This suggests that the way spaces are planned, allocated, and connected strongly influences cost efficiency: well-utilized spaces reduce wasted floor area, limit unnecessary partitions and extensions, and minimize frequent remodeling triggered by poor functionality. Where space planning reflects actual household routines, cultural preferences, and future growth needs, design and redesign costs become easier to control and better justified. Conversely, the finding that operational costs have no significant effect on optimizing building design and redesign costs indicates that, within this context, expenses such as day-to-day energy or routine running costs are not the primary factor shaping design/redesign cost optimization decisions. This may reflect the reality that owner-occupiers often prioritize immediate functional satisfaction with how the spaces work and feel over longer-term operating considerations when making layout and redesign choices.

Recommendations

Based on the findings that owner-occupier needs/expectations are central to cost optimization**,** that space utilization significantly and positively influences the optimization of building design and redesign costs in Enugu Metropolis, and that operational costs show no significant effect, the following recommendations are proposed:

i. Building construction companies should facilitate regular consultations with owner-occupiers to gather insights on their specific needs and expectations. Conduct surveys and focus groups to understand preferences related to space, functionality, and overall experience in the built environment.
ii. Building construction companies should maintain minimum best practices for ventilation, daylighting, and energy-efficient fixtures, but avoid allowing operational-cost arguments to distort essential spatial functionality.

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