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EFFECT OF SUSTAINABLE ARCHITECTURE ON PROJECT MANAGEMENT IN MANUFACTURING FIRM SOUTH EAST NIGERIA

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Abstract: The study examined the effect of Sustainable Architecture on Project Management in a Manufacturing Firm in South East Nigeria. The specific objectives were to; examine the effect of Resource Efficiency on Project Management in a Manufacturing Firm, evaluate the effect of Waste Reduction on Project Management in a Manufacturing Firm South East Nigeria. A descriptive survey design was adopted for the study. A structure questionnaire design with a five-point Likert scale was using to collect data for the study. The collected data were then coded and imported into SPSS 28.0; the hypothesis results were evaluated through Multiple Regression analysis. The result revealed that Resource Efficiency has a significant positive effect on Project Management in Manufacturing Firm with a P-Value of (0.003<0.05). Waste Reduction has a significant positive effect on Project Management in Manufacturing Firm with a P-Value of (0.003<0.05), South East Nigeria. The study concluded that Sustainable Architecture has significant positive effect on Project Management in a Manufacturing Firm in South East Nigeria. The study recommended among others that Manufacturing firms should prioritize the implementation of resource-efficient practices. This can include investing in advanced technologies and processes that optimize the use of materials and energy. Regular training for employees on resource management can further enhance efficiency.
Keywords: Architecture, Firm, Project, Management, Sustainable

1.1 Introduction

Architecture, the art and science of designing buildings and structures, plays a pivotal role in shaping our built environment. It encompasses a wide range of disciplines, including engineering, design, urban planning, and environmental sustainability (Cemex 2024). Throughout history, architecture has reflected cultural values, technological advancements, and societal needs, evolving in response to changing circumstances and aspirations. The study of architecture can be traced back to ancient civilizations, with monumental structures such as the Pyramids of Giza and the Parthenon embodying the ingenuity and creativity of their creators (Isarch. 2025). These early works not only served functional purposes but also communicated the cultural identity and beliefs of their societies. As civilization

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progressed, architectural styles evolved, influenced by factors such as geography, climate, and materials available, leading to diverse expressions ranging from Gothic cathedrals to modernist skyscrapers (Pickard 2024).

Sustainable architecture, also known as green architecture or environmental architecture, is a design approach that minimizes the negative environmental impact of buildings through improved efficiency and moderation in the use of materials, energy, development space, and the ecosystem at large (Zeysey. 2024). It seeks to create environmentally conscious, socially responsible, and economically viable buildings. Sustainable architecture integrates a range of practices and technologies to reduce the environmental impact of buildings throughout their lifecycle, from construction to operation and eventual disposal (The Daily Star 2025). The core principles of sustainable architecture revolve around minimizing environmental harm, enhancing human health, and providing economic benefits. This involves a conscious approach to energy and ecological conservation in the design of the built environment (JGU. 2024). Sustainable design emphasizes the efficient use of resources, including energy and water, and the selection of materials with low environmental impact (Baafi, & Opoku, 2025). The importance of sustainable architecture is underscored by the environmental challenges facing the world today. The building sector contributes significantly to global greenhouse gas emissions, and sustainable architecture offers practical solutions to reduce these emissions and combat climate change (Byrne, 2024). By prioritizing energy efficiency, renewable materials, and mindful site selection, architects can create buildings that minimize environmental impact and promote healthier living environments. Sustainable architecture not only addresses environmental concerns but also enhances the economic sustainability and quality of life for those who use the structures (Faisal, et al 2021).

Sustainable architecture is increasingly recognized as a vital approach in various sectors, including manufacturing, particularly in regions like South East Nigeria. This approach emphasizes the design and construction of facilities that minimize environmental impact while enhancing efficiency, safety, and well-being (Handoyo, 2024). In a manufacturing context, where operational efficiency and resource management are critical, the principles of sustainable architecture offer significant advantages. In South East Nigeria, known for its growing industrial base and rich cultural heritage, the adoption of sustainable architectural practices in manufacturing firms is becoming essential. As the region faces challenges such as rapid urbanization, resource scarcity, and environmental degradation, integrating sustainability into project management becomes crucial for ensuring long-term viability and competitiveness (Jane, 2025). This shift not only addresses environmental concerns but also aligns with global trends towards sustainability, which are increasingly influencing consumer preferences and regulatory frameworks.

1.2 Statement of the problem

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The manufacturing sector in South East Nigeria is facing significant challenges related to environmental sustainability, operational efficiency, and regulatory compliance. As global awareness of environmental issues increases, there is a pressing need for manufacturing firms to adopt sustainable architectural practices that minimize ecological impact while optimizing resource use. However, many firms in the region lack the necessary frameworks and expertise to effectively integrate sustainability into their project management processes.

Despite the potential benefits of sustainable architecture, including reduced operational costs, improved employee well-being, and enhanced corporate reputation, manufacturing firms in South East Nigeria often struggle with the implementation of these practices. Factors such as limited access to sustainable materials, inadequate training in sustainable design principles, and insufficient stakeholder engagement hinder the successful adoption of sustainable architecture.

Furthermore, project managers within these firms frequently encounter challenges in aligning sustainability objectives with traditional project management metrics, such as cost, time, and quality. This misalignment can lead to suboptimal outcomes, where environmental and social considerations are overlooked, ultimately compromising the long-term viability of manufacturing operations.

This problem is compounded by the region's rapid urbanization and industrial growth, which increases pressure on natural resources and the environment. As a result, there is an urgent need for a comprehensive understanding of how sustainable architecture can be effectively integrated into project management practices in manufacturing firms in South East Nigeria. This study aims to explore the barriers and opportunities associated with this integration, providing insights that can guide firms toward more sustainable and resilient manufacturing practices.

1.3 Objective of the Study

The main objective of the study is to examine the effect of Sustainable Architecture on Project Management in a Manufacturing Firm in South East Nigeria. The specific objectives were to;

i. Examine the effect of Resource Efficiency on Project Management in a Manufacturing Firm in South East Nigeria.

ii. Evaluate the effect of Waste Reduction on Project Management in a Manufacturing Firm South East Nigeria.

1.4 Hypotheses of the study

i. Resource Efficiency has no significant effect on Project Management in a Manufacturing Firm in South East Nigeria.

ii. Waste Reduction has no significant effect on Project Management in a Manufacturing Firm South East Nigeria.

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Review of Related Literature

2.1 Conceptual Review

Sustainable Architecture

Reducing the adverse effects of the built environment on natural systems while promoting resource resilience and occupant well-being is the goal of sustainable architecture (Kibert, 2016). In practical terms, Kibert (2016) defines the topic as green building design and delivery that uses construction practices, standards, and technologies (such as passive solar, energy-efficient systems, and insulation) to improve operational performance and reduce resource consumption. It connects design choices to quantifiable results (materials, water, energy) and to the expert processes that enable buildings to function, which makes it practice-oriented and significant. According to Lee (2020), sustainable design needs to be reinterpreted to take into account configurational and spatial aspects, such as building arrangement, space sequencing, and how these decisions affect social interaction and environmental performance, in addition to energy metrics. This point of view encourages designers to think of form and use patterns as sustainability agents rather than merely technological tools.

According to Mhatre et al. (2021), circular approaches promote design for disassembly, material passports, component reuse, and waste-minimizing construction processes instead of considering structures and buildings as single-use end products. The importance of social sustainability and occupant well-being is growing. According to modern writers, sustainable architecture must provide social justice (affordable housing, inclusive design, and community involvement) and healthy indoor settings (air quality, daylighting, and thermal comfort). Participatory design, contextually relevant solutions, and regulations that keep lower-income neighborhoods from being excluded by green premiums are all emphasized by this social turn. The equity lens compels architects to take distributive implications of sustainability measures into account, complicating straightforward "green tech" prescriptions. To transition from discrete projects to systemic change, researchers advise increased regulatory incentives (carbon accounting, circular procurement), early use of life-cycle tools, and integrated, interdisciplinary project teams (Røstvik, 2021).

Resource Efficiency

Resource efficiency, when considering the full range of resources, such as raw materials, energy, water, air, land, soil, and ecosystem services, is the ability to produce more (economic) value with less input of resources (Hirschnitz-Garbers et al, 2013). Utilizing available resources most efficiently and sustainably is what is meant by resource efficiency at the corporate level. This typically refers to the use of material resources to minimize environmental impact while maintaining the business's operations, health, and profit. (Bryne, 2024) It is a wide word that can zoom out to analyze a company's

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involvement in global efforts to be more resource-efficient, or it can zoom in to the smallest details of a company's supply chain. Resource efficiency is presented as an economic tactic to boost competitiveness, safeguard supply chains, and decouple growth from resource use, in addition to being an environmental necessity that reduces extraction, waste, and ecological strain. There is compelling evidence that more economic growth and employment can result from improved resource efficiency. To do this, though, will necessitate removing obstacles to resource efficiency through adjustments to the pace and direction of technological advancement and innovation, as well as a combination of wise and focused regulation, suitable funding for supporting infrastructure, environmental tax reform, strategic fiscal policy, and sustainable public procurement to promote resource efficiency and innovation (Ekins & Hughes, 2016).

According to Bryne (2024), companies can typically exhibit efficiency through cross-sector collaboration, adherence to regulatory frameworks, and proven new product designs. Resource efficiency is crucial for modern businesses because it ensures that money that could be used elsewhere is not wasted, it pleases shareholders, it keeps investors, customers, and employees from criticizing you for being excessively wasteful, it contributes to environmental sustainability by protecting biodiversity, natural habitats, and emissions, and it can increase profitability, particularly if your business quickly adopts resource efficiency (Bryne, 2024). Resource efficiency shifts frequently need for focused investments in waste infrastructure, better material-flow data, and assistance for SMEs to implement circular practices, according to regional and national research. According to Ghisetti and Rennings (2014), a company's performance can actually be improved by implementing well-planned resource efficiency measures that increase the firm's overall production level.

Waste Reduction

Waste reduction refers to any action that stops or slows the pace at which waste is generated per person. In order to reduce the negative effects of human activity on the environment, a comprehensive strategy for waste reduction must be implemented, encompassing measures that can be implemented by businesses, individuals, government organizations, and industries (Malokani et al, 2023). A key component of sustainable production is waste reduction. It entails methodical attempts to reduce waste material production during the manufacturing process. Implementing effective resource management, embracing circular economy ideas like sustainable design, and embracing lean manufacturing are some strategies. Waste reduction increases a company's cost-effectiveness while simultaneously conserving resources and reducing its impact on the environment. According to research by Goyal, Rahman, and Kazmi (2020), companies that use eco-design and green manufacturing, among other sustainable production techniques, have a higher chance of reducing waste and emissions and improving their environmental performance. Waste reduction contributes to resource conservation. Reduced use reduces the requirement for raw resources, which are expensive to acquire and produce. This reduces

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economic pressure on sectors that depend on natural resources and helps stabilize market pricing (Malokani et al, 2023).

Cities and corporations can save a significant amount of money by managing garbage effectively. Businesses can cut expenses associated with disposal, including transportation and landfill fees, by producing less waste. Additionally, companies that recycle can frequently make additional money by selling these materials. The manufacturing industry is becoming more sustainable and responsible as a result of strategies including material reuse, enhanced production procedures, and investments in environmentally friendly technologies (Jane, 2025). Han et al. (2018) discovered that businesses are more likely to adopt sustainable practices and reduce waste and emissions when they are subject to stronger environmental laws. Companies may face obstacles when adopting sustainable practices that lower emissions and waste, such as the requirement for a sizable upfront investment and adjustments to current procedures.

According to Chen et al. (2018), it is crucial for businesses to carefully weigh the advantages and disadvantages of sustainable practices and create a strategic plan that complements their overarching objectives. A growing number of stakeholders are requesting that businesses take concrete steps to lessen and resolve their environmental impact, making waste and emissions reduction a crucial component of environmental sustainability strategies for businesses (Sarkis et al., 2021). Businesses that implement sustainable manufacturing practices, such as energy-efficient technology and waste management systems, have a higher chance of reducing waste and emissions and enhancing their overall environmental performance, according to Vimal et al. (2021).

Project Management

Project management is the process of coordinating people, money, technology, and intellectual property in order to accomplish goals. Though it frequently divides that larger project into shorter-term tasks, project management supervises larger outputs, whereas operations management concentrates more on daily chores. The five main parts of project management are planning, initiation, execution, monitoring and control, and project closure. Establishing the project's goals and viability is the first step. Budgets, schedules, resources, and tasks are all outlined in planning. While execution carries out that strategy, monitoring and control keep tabs on the project's advancement in relation to that plan. Lastly, project closure acquires stakeholder approval and produces the final product, among other things (Mansa, 2025). According to Meredith, Shafer, and Mantel (2021), project management is the methodical process of organizing, planning, directing, and regulating resources in order to achieve a particular goal within a constrained amount of time. They contend that customer satisfaction, corporate strategy alignment, and effective response to environmental uncertainty are all crucial components of successful project management, in addition to the use of organized procedures. In order to meet the technical, financial, and temporal restrictions of a project, Kerzner (2022) defines project management

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as the planning, scheduling, and control of resources. He emphasizes how interconnected project elements are and how effective resource coordination requires integrated approaches.

According to PMI (2021), project management is "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements." This concept highlights the significance of matching project outcomes with predefined requirements, as well as methodical processes and standardized practices. The classic "iron triangle" or "triple constraint" method that has long dominated the sector is reflected in it as well as the functional role that project management plays in controlling scope, time, cost, and quality. Themes recur across these definitions. Project management, according to all authors and organizations, entails short-term, distinct activities with clear goals and calls for the methodical application of information, resources, and abilities.

Additionally, they both agree that project management differs from regular operations management due to the fact that projects have deadlines and specific deliverables. Rapidly evolving global markets, technology, and education are driving a number of new advancements and interests in project management. Prices, response times, and product/service innovation are all under pressure from global competition. In response to these demands, businesses are expanding their use of computer and telecommunications technology as well as education, pushing the limits of project management into areas where new tools are being created for previously unimagined project kinds. Additionally, the need for an increasing number of goods and services has prompted the start of additional projects, but with shorter timelines. We examine many trends one after the other (Meredith and Mantel, 2021).

Theoretical Reviews

Resource-Based View (RBV)

According to Barney's Resource-Based View (RBV), businesses must use their resources in a valuable, rare, inimitable, and non-substitutable (VRIN) manner in order to gain a sustained advantage. RBV states that a resource cannot produce a competitive advantage if it is misused or underutilized. According to Baafi and Opoku (2025), RBV makes a distinction between the firm's competencies and its resources. Skills like integrated supply chain management, agile approaches, and lean project management convert resources into effective results. Allocating resources to the most strategically important tasks is the key to efficiency. For example, businesses must use smart technology in ways that boost productivity and speed up operations; simply having it is insufficient (D'Oria, 2021).

Applications of RBV that are more recent relate to sustainability. In settings where eco-efficiency and circular economy practices are required, businesses that use resources effectively not only save money but also acquire credibility and a sustained edge (Dangelico & Vocalelli, 2017). RBV also implies that success depends on making effective use of one's time, abilities, and financial resources. Compared to rivals, a project team with specialized knowledge and strong teamwork skills can deliver more quickly and with fewer resources. In this context, resource efficiency refers to use capabilities (such as agile

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sprints, risk management, or project scheduling) to extend scarce resources and guarantee that project goals are met without incurring excessive costs or needless duplication (Monson, 2024).

2.2 Theoretical Framework

Urban Metabolism Theory

The framework offered by urban metabolism theory helps to explain the intricate relationships that exist between urban environments and human activity. Cities are viewed by this theory as living things that generate garbage, use resources, and change over time. Through the examination of material and energy flows within urban systems, Urban Metabolism Theory seeks to improve sustainability and provide guidance for urban development. According to Zhang (2013), urban metabolism is a crucial study philosophy and methodology for analyzing urban megaorganisms and the ecological and environmental issues they cause.

Urban Metabolism Theory places a strong emphasis on closed-loop systems, which reduce waste and reuse or recycle resources. According to Kennedy et al. (2017), this strategy is in line with the circular economy's tenets, which aim to lessen the impact on the environment by preserving the value of resources in the economy for as long as feasible. Participation of the community in sustainability projects is encouraged by urban metabolism. Increased knowledge of resource flows might inspire locals to support neighborhood projects that enhance urban surroundings and embrace more sustainable practices. Policymakers can use insights from research on urban metabolism to develop rules and incentives that encourage sustainable behavior. Setting goals for emissions, waste reduction, and resource consumption may be one way to achieve this (Currie and Musango, 2017).

2.3 Empirical Reviews

Faisal et al (2021) conducted a study to examine the impact of resource efficiency actions on the financial performance of SMEs in Pakistan. The study aims to evaluate the relationship between resource efficiency actions and firm performance of SMEs, whether it is positively associated with each other or vice versa, and to also assess the moderating effect of eco-investment and production cost on the link between resource efficiency actions and financial performance of SMEs. The study utilized a quantitative method of research. The results revealed that the eco-investment and production cost moderate the link between the variables, and the benefits of resource efficiency actions can never be neglected if these tactics are properly implemented for a period of long run.

Malokani et al (2023) conducted a study to explore the impact of reduction of waste and waste, green employee behavior and reduction of resource use on environmental strategy in manufacturing companies of Sindh, Pakistan. The study aims to explore the relationship between the reduction in the usage of resources and the environmental performance of manufacturing companies in Sindh, Pakistan. The study utilized a cross-sectional design. The results revealed that top management should prioritize

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the development of effective strategies to promote the reduction of waste and waste, green employee behavior, and the reduction of resource use in future strategies.

Handoyo (2024) conducted a study on the determinants of resource efficiency and its implications for emission reduction performance from five ASEAN countries (Indonesia, Malaysia, Singapore, Thailand, and the Philippines). The study aims to investigate the impact of green innovation, Corporate Social Responsibility (CSR) strategy, and corporate governance on resource efficiency, as well as the influence of resource efficiency on emission reduction performance. The study adopted a Structural Equation Modeling (SEM). The results revealed a positive relationship between green innovation and resource efficiency.

Jane (2025) conducted a study to explore the effect of waste reduction programs on public attitudes towards waste management in Chennai. The study aims to analyze various waste reduction programs, including community recycling initiatives, composting education, and public awareness campaigns in Chennai. The study utilized surveys and case studies. The results revealed that participation in these programs positively shifts public attitudes, fostering a greater sense of responsibility and commitment to sustainable practices.

3. Methodology

Area of Study

One of Nigeria's six geopolitical zones is the South-East area, sometimes known as the South-East geopolitical zone. consists of the states of Anambra, Imo, Enugu, Abia, and Ebonyi. It is a major manufacturing center in Nigeria. It blends classic industries like textiles with more contemporary ones like automotive and pharmaceuticals. The South-West zone (via Edo State) to the west, the North-Central zone (Benue, Kogi) to the north, and the South-South zone (Cross River, Rivers, Akwa Ibom, Delta) to the south all enclose the region. Although it is one of the most densely populated areas of Nigeria, its 29,000 km² area makes it relatively tiny in comparison to other zones. The South-East is predominantly inhabited by the Igbo ethnic group, one of the three largest in Nigeria (alongside Yoruba and Hausa-Fulani). The Igbo population is known for being highly entrepreneurial, industrious, and mobile, with significant migration to other parts of Nigeria and abroad (Benjamin, 2019; Vitalis, 2019). Rich reserves of solid minerals and natural resources, including coal, tin, columbite, sandstone, lignite, kaolin, clay, bauxite, natural gas, crude oil, and iron ore, are abundant in the zone. The area has a great chance of drawing investments across a number of industries. South-East Nigeria produces a wide range of goods, including electronics, building materials, food processing, textiles, automobiles, and medicines. Among the noteworthy trends are: Highly localized clusters: Glass, components, plastics, and logistical services are all supported by the manufacturing hubs of Onitsha, Nnewi, Aba, and Enugu. Emerging formal industrialization: Indigenous firms like Innoson and ANAMMCO have inked local assembly partnerships and strategic industrial footprints in the region. Economic resilience and

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employment: The sector provides significant employment and has growth potential. Reports suggest the manufacturing sector in the region contributed approximately 10% to Nigeria's GDP, with steady annual growth rates of 3.4% in 2021 and 2.5% in 2022 (Mohammed, 2024).

Method

The primary aim of research design is to establish a structure for the collection, analysis, and interpretation of data. In this study, a descriptive survey design will be utilized. This method emphasizes the description of data and the traits of a population, seeking to collect factual, precise, and organized information while detailing the subjects under investigation. It is especially advantageous given the sizable population from which the data was sourced. The research was conducted in selected private sectors in southeastern Nigeria, known for their long-standing integrity. This study employed the survey research design to demonstrate how sustainable Architectural on Project Management in a Manufacturing Firm in South East Nigeria. Data was gathered using suitable instruments, particularly questionnaires designed with a five-point Likert scale. The survey was pertinent as it collected primary data crucial for analyzing the relationships between variables. The collected data were then coded and imported into SPSS. To ensure that the relevant aspects were accurately recorded, the data was modified, coded, and recoded. Subsequently, descriptive statistics were used to analyze and characterize the data. Meanwhile, the hypothesis results were evaluated through Multiple Regression analysis. If the regression statistical measures fell below the $\alpha = 0.05$ significance level, they were considered acceptable and significant.

4. Data Presentation and Analysis

4.1 Data Presentation

The study included a population of 236 individuals. Around 180 questionnaires were returned, resulting in a return rate of 76.3%, which is deemed acceptable. Descriptive and correlation analyses were employed to evaluate the data. A pilot test conducted on 36 questionnaires yielded a Cronbach's alpha of 0.775, indicating satisfactory reliability. The findings are presented in the tables below.

4.2 Results

4.2.1 Gender of Respondents

The study population comprised of a greater number of females than males as shown in the pie chart below.

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Table 2: 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 3: 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 4: 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		

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Table 5: Distribution of Respondents' Educational Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below High School	6	3.3	3.3	3.3
	High School	31	17.2	17.2	20.6
	Graduate 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	

Table 2-5 presents the demographic details of the respondents, including their gender, age, location, and educational qualifications. The data indicates that the majority of respondents are male, comprising approximately 107 individuals (59%). The most common age group is between 21 and 30 years, with about 109 respondents (61%). Regarding location, most participants are from urban areas, accounting for 117 individuals (65%) of the total sample. Lastly, the educational qualifications reveal that a significant portion of respondents, 131 individuals (72.8%), hold a university degree.

4.3 Multiple Regression Analysis

Table 4.3: Multiple Regression Table

Model 1	Beta	Std. Error	t-Statistic	P-value
Resource Efficiency	0.71145	0.41319	1.72184	0.031
Waste Reduction	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

Table 4.3 above displays the results of the multiple regression analysis for both hypotheses one and two. This analysis was conducted at a 5% significance level and indicates that all predictor variables significantly influence the outcome variables. Further details are provided in the following hypothesis.

4.3 Hypotheses of the study

4.3.1 Hypothesis One

i. H_{o1}: Resource Efficiency has no significant effect on Project Management in a Manufacturing Firm in South East Nigeria.

Regression Model of Hypothesis 1

Below is the equation for a model for Hypothesis 1

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$$PM = \beta_0 + \beta_1 RE + \varepsilon_i \qquad (1)$$

PM = Project Management
DI= Design Innovation

Table 4.4.1: Regression Coefficient for model 1

Model 1	Beta	Std. Error	t-Statistic	P-value
Resource Efficiency (RE)	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

Table 4.4.1 shows the values of adjusted R Square, unstandardized beta coefficient, standard error, t value, and P value. The value of adjusted R square is 0.698 meaning thereby 69.8% variation on Project Management (PM), is explained by Resource Efficiency (RE) and the rest of the variation is unexplained on Project Management due to variables that has not been considered in this model.

Besides, the value of the unstandardized beta coefficient is 0.71199 which means that if Resource Efficiency (RE) increases by one unit, then Project Management (PM) will increase by 0.71199 units. This effect is statistically significant as the p-value is =0.037 which is less than 0.05 at 95% confidence interval. Therefore, the null hypothesis is rejected, and it can be said that there is a significant effect of Resource Efficiency (RE) on Project Management (PM). in a Manufacturing Firm in South East Nigeria.

4.4.2 Hypothesis Two

ii. H_{o1}: Waste Reduction has no significant effect on Project Management in a Manufacturing Firm South East Nigeria.

Regression Model of Hypothesis 2

Below is the equation for a model for Hypotheses 2

$$PM = \beta_0 + \beta_1 WR + \varepsilon_i \qquad (2)$$

PM= Project Management
WR = Waste Reduction

Table 4.4.2: Regression Coefficient for Model 2

Model 1	Beta	Std. Error	t-Statistic	P-value
Waste Reduction (WR)	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

Table 4.4.2 shows the values of adjusted R Square, unstandardized beta coefficient, standard error, t value, and P value. The value of adjusted R square is 0.698 meaning thereby 69.8% variation in the

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Project Management (PM) is explained by Waste Reduction (WR) and the rest of the variation is unexplained on Project Management due to variables that has not been considered in this model. Besides, the value of the unstandardized beta coefficient is 0.22714 which means that Waste Reduction (WR) increases by one unit, then Project Management (PM) will increase by 0.22714 units. This effect is statistically significant as the p-value is <0.000 which is less than 0.05 at a 95% confidence interval. Therefore, the null hypothesis is rejected, and it can be said that there is a significant effect of Waste Reduction (WR) in Project Management in a Manufacturing Firm South East in Nigeria.

4.4 Discussion of Findings

The study examined the effect of Sustainable Architecture on Project Management in a Manufacturing Firm in South East Nigeria. The Cronbach's alpha for these selected items was 0.775 as shown in Table 4.1, this result indicates that the items were reliable for measuring the variables we have selected.

The multiple linear regression results in Table 4.4.1 and 4.4.2 suggest that for hypothesis one, at a 5% level of significance, the Resource Efficiency has a statistically significant effect on Project Management in a Manufacturing Firm in South East Nigeria. while for hypothesis two, at a 5% level of significant the Waste Reduction has a statistically significant effect on Project Management in a Manufacturing Firm in South East Nigeria. This result is based on their respective p-values which are below the threshold of < 0.05.

5. Conclusion

In conclusion, the study highlights the significant impact of Sustainable Architecture on Project Management within manufacturing firms in Southeast Nigeria. The findings reveal that Resource Efficiency plays a crucial role in enhancing project management practices. By optimizing the use of resources, firms can not only reduce costs but also improve overall productivity and sustainability. Moreover, Waste Reduction emerged as another key factor influencing project management effectiveness. Implementing sustainable practices that minimize waste not only contributes to environmental conservation but also streamlines processes, leading to better project outcomes.

Overall, the integration of sustainable architectural principles in project management fosters a more efficient and responsible approach to manufacturing. This alignment not only supports the firms' operational goals but also contributes to broader environmental and social objectives, positioning them as leaders in sustainable practices in the region. Embracing these principles will be vital for future growth and competitiveness in the ever-evolving manufacturing landscape of Southeast Nigeria. The study concluded that Sustainable Architecture has significant positive effect on Project Management in a Manufacturing Firm in South East Nigeria.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance the effect of Sustainable Architecture on Project Management within manufacturing firms in Southeast Nigeria:

i. Manufacturing firms should prioritize the implementation of resource-efficient practices. This can include investing in advanced technologies and processes that optimize the use of materials and energy. Regular training for employees on resource management can further enhance efficiency.

ii. Firms should develop and integrate comprehensive waste reduction strategies into their project management frameworks. This may involve conducting waste audits, adopting recycling initiatives, and exploring innovative methods for reusing materials to minimize waste generation.

References

Baafi, P. K. O., & Opoku, M. O. (2025). Resource-Based View Factors Driving SME Growth: A Systematic Review. Journal of Cleaner Production Volume 165, Pages 1263-1279.

Benjamin, O. C. (2019). Four Years of Buhari Administration and the Challenge of Infrastructural Decay: A Study of the South-East Geopolitical Zone of Nigeria. International Journal of Comparative Studies in International Relations and Development, 5(1), 46–59.

Byrne, D. (2024). What does resource efficiency mean? Corporate Governance Institute.

Cemex Ventures. (2024). Sustainable Architecture: What Is & Examples.

Chen, Y., Lai, K. H., & Wong, C. W. (2018). Drivers and enablers that foster environmental sustainability practices in the hotel industry: An integrative systematic review. International Journal of Hospitality Management, 70, 41-50.

Currie, P.K. and Musango, J.K. (2017). African Urbanization: Assimilating Urban Metabolism into Sustainability Discourse and Practice. Journal of Industrial Ecology, 21: 1262-1276.

Dangelico, R. M., & Vocalelli, D. (2017). "Green marketing": An analysis of definitions, strategy steps, and tools through a systematic review of the literature. Journal of Cleaner Production, 165, 1263–1279.

D'Oria, L. (2021). The Evolution of Resource-Based Inquiry: A Review and Meta-Analytic Integration of the Strategic Resources–Actions–Performance Pathway Journal of Management 47(6).

Ekins, P., & Hughes, N. (2016). Resource efficiency: Potential and economic implications: Summary for policy-makers. International Resource Panel, United Nations Environment Programme.

Faisal, M., Ahmad, A., Riaz, S., & Rahman, Z. U. (2021). The impact of resource efficiency actions on firm performance, the moderating role of eco-investment, and production cost. International Journal of Management Research and Emerging Sciences, 11(4), pp 43-55.

Ghisetti, C., & Rennings, K. (2014). Environmental innovations and profitability: How does it pay to be green? An empirical analysis on the German innovation survey. Journal of Cleaner Production, 75, 106–117.

Goyal, P., Rahman, Z., & Kazmi, A. A. (2013). Corporate sustainability performance and firm performance research: Literature review and future research agenda. Management Decision, 51(2), 361–379.

Han, Y., Yu, M., & Zhu, Q. (2018). Exploring the impact of environmental regulations on eco-innovation: Evidence from China's manufacturing firms. Journal of Cleaner Production, 196, 1570-1581.

Handoyo, S. (2024). The determinants of resource efficiency and its implications for emission reduction performance. Social Sciences & Humanities Open, 10, Article 101155.

Hirschnitz-Garbers, M., Montevecchi, F., Martinuzzi, A. (2013). Resource Efficiency. In: Idowu, S.O., Capaldi, N., Zu, L., Gupta, A.D. (eds) Encyclopedia of Corporate Social Responsibility. Springer, Berlin, Heidelberg.

Isarch Award official site. (2025). Sustainable Design in Architecture: Transforming the Built Environment for Future Generations.

Jane, K. (2025). The effect of waste reduction programs on public attitudes towards waste management. [Paper]. ResearchGate.

JGU. (2024). The Future of Sustainable Architecture: Trends and Innovations.

Kennedy, C. A., Cuddihy, J., & Engel Yan, J. (2017). The changing metabolism of cities. Journal of Industrial Ecology, 11(1), 43-59.

Kerzner, H. (2022). Project Management: A Systems Approach to Planning, Scheduling, and Controlling (13th ed.). John Wiley & Sons, Inc.

Kibert, C. J. (2016). Sustainable construction: Green building design and delivery (4th ed.). John Wiley & Sons.

Lee, J. H. (2020). Reinterpreting sustainable architecture: What does it mean syntactically? Sustainability, 12(16), 6566.

Malokani, D. K. A. K., Qureshi, A. A., Inayat, A., & Mahar, Q. (2023). Impact of reduction of waste and waste, green employee behavior, and reduction of resource use on environmental strategy: Manufacturing companies' top management's perception. Journal of Social Sciences Review, 3(2), 27–39.

Mansa J (2025). What Is Project Management and What Are the Types? The Investopedia Team.

Mohammed Y (2024). Interrogating Insurgence in the South-East Nigeria: A Political Brouhaha or a Political Solution? NG Journal of Social Development. 13. 38-53.

Meredith, J.R. and Mantel Jr., S.J. (2021) Project Management: A Managerial Approach (11 Edition). John Wiley & Sons, Hoboken.

Mhatre, P., Gedam, V. V., Unnikrishnan, S., & Raut, R. D. (2023). Circular economy adoption barriers in the built environment – a case of an emerging economy. Journal of Cleaner Production. Advance online publication.

Monson, F. K. S. (2024). Unveiling the strategic resource dimension: A bibliometric and systematic review of the Resource-Based View and its application to corporate governance. The Journal of High Technology Management Research 35(2):100516.

Røstvik, H. N. (2021). Sustainable architecture: What's next? Encyclopedia, 1, 293–313.

Pickard Chilton. (2024). Emerging Trends in Sustainable Architecture.

Project Management Institute. (2021). A guide to the project management body of knowledge (PMBOK® Guide) (7th ed.). PMI.

Sarkis, J., Xue, L., & Krumwiede, D. (2021). A critical review and future research directions on sustainable supply chain management: Moving towards a circular economy. Journal of Cleaner Production, 312, 127551.

The Daily Star. (2025). British Council initiates research on sustainable architecture in Bangladesh.

Vimal, K. E., Abdulrahman, M. D., & Haridoss, R. (2021). An empirical analysis of sustainable manufacturing practices and environmental performance: The moderating role of firm size. Journal of Cleaner Production, 305, 127553.

Vitalis, E., Agbeaze, E. K., & Obamen, J. (2019). A case of selected manufacturing firms in South-East [Nigeria]. Journal of Human Ecology, 67(1–3), 31–44.

Zeysey. (2024). Featured Architecture Trends of 2024: From Natural Materials to Sustainable Designs.

Zhang, Y. (2013). Urban Metabolism: A Review of Research Methodologies." Environmental Pollution 178: 463–473.