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SUSTAINABILITY STRATEGIES AND PERCEIVED EFFECTIVENESS IN URBAN DEVELOPMENT PROJECTS IN ABUJA, NIGERIA

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ABSTRACT

This paper explores the adoption and perceived effectiveness of project management sustainability practices of managers in construction and urban planning projects across the Federal Capital Territory (FCT), Abuja, Nigeria. The findings from a source study of 220 project managers show that at project management operational and organizational levels the most prevalent sustainable management practice categories were energy efficient design (4.08), environmental impact assessment (3.95) and environmentally conscious materials (3.82). Waste minimization and recycling was the most prevalent operational category (3.65) and organizational strategies were less prevalent with staff training programmes (3.18), partnerships with environmental agencies (3.10), and sustainability reporting (3.05). Practical and managerial effectiveness was rated as moderate (mean = 3.45): 51.9% of project managers were positive about the effectiveness of sustainability initiatives on construction and urban projects, 29.1% remained neutral, and 19.0% viewed the practices negatively. Environmental, social and economic benefits were respectively rated as moderate, with health and safety of workers (3.75), energy savings (3.65), and cost efficiencies (3.58) some of the more acknowledged benefits. This paper contextualizes the findings within the project-sustainability literature and suggests how performance measurement may be enhanced, while appreciating the importance of integrating sustainability into project management organizations.

I. INTRODUCTION

Sustainable development is the overarching context in which construction and urban development are evaluated; it is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). If it is to

serve its purpose, sustainable project management needs to operationalize this general goal into specific decisions and measurable results (Silvius et al., 2012; Marcelino-Sádaba et al., 2015). The decisions made in construction and urban development include efficiency and sustainability of design, choice of materials, waste minimization, safety of construction workers, local employment, stakeholder involvement and the whole life operating performance of assets. The TBL approach will assist because it requires consideration of people, planet and economic factors (Elkington, 1997; Savitz & Weber, 2006).

The implications are large. Building construction accounts for a large proportion of energy and raw material consumption and of waste generation. (Ortiz et al., 2009; Zuo and Zhao, 2014). The global 2030 Agenda for Sustainable Development and SDG 11 on inclusive, safe, resilient and sustainable cities and human settlements, in particular, offer that agenda a policy context for projects' decisions (United Nations, 2015). Abuja, a planned capital city which has been expanding since Nigeria became independent through constructions initiated by the public sector, but also by private ones, provides such a context.

Empirical evidence about sustainability in project management is still largely limited, despite growing research on this topic; empirical findings have been criticised as not always reflecting the actions of the practitioners and the criteria used to determine their performance (Silvius et al., 2017; Aarseth et al., 2017). Drawing on findings from research into construction industries in developing countries, barriers to the adoption of socially and environmentally sustainable practices – including lack of awareness, institutional constraints, the costs associated with these practices and the discrepancy between legislation and practice – frequently hinder the adoption of technically effective measures (Ametepey et al., 2015; Banihashemi et al., 2017; Windapo & Goulding, 2015). Evidence for Nigerian project managers on these issues is still limited.

The target study has identified that project managers have adopted various technical and operational dimensions of strategies to attain sustainability in Abuja, although organisational and capacity-building options were more limited. It also shows that the overall impact is of medium magnitude. This paper synthesises these results in order to probe whether adoption profiles are consistent with a more comprehensive view of sustainability outcomes. In particular: (i) which sustainability strategies are most and least prevalent; (ii) the effectiveness rating given by project managers; and (iii) how the perceived impacts are spread across the TBL's environmental, economic and social pillars.

II. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Sustainability in Project Management

Sustainable development can be defined as"[dealing] with sustainability concerns…on each…stage of the project life cycle: idea/initial planning, concept/definition, execution and decommissioning" (Labuschagne and Brent, 2005). This approach is contrary to earlier work on project management which viewed sustainability as an external constraint which project managers must comply with. Silvius et al. (2012) reviewed the previous research and found it to be fragmented and the integration of sustainability in project management practice, competences and tools was in its infancy. In their systematic review, Silvius et al. (2017) identified the limitation that little empirical research on implementation had been conducted, particularly in the developing world. Marcelino-Sádaba et al. (2015) presented a model for the integration of sustainable development into project management processes and Aarseth et al. (2017) identified several levels at which project sustainability strategies operate and showed their interdependence.

The Triple Bottom Line

In 1997 Elkington (1997) proposed the Triple Bottom Line arguing organisations should report social and environmental as well as financial performance. Savitz and Weber (2006) propose the triple bottom line as a management model, making it clear all three elements are interrelated and will all need to be managed simultaneously. The TBL has also been the subject of criticism. For example, Slaper and Hall (2011) observes that the three individual elements are expressed in various units and are not very useful when trying to aggregate elements of the TBL. This can encourage organisations to report on anything that is easy to measure rather than what is important; project indicators are a managerial decision themselves and a balanced view would need indicators for each element.

Sustainability Strategies in Construction and Urban Development

Sustainable construction strategies are often categorised as technical, procurement, operational or organisational. Technical strategies involve such activities as: energy-conscious building design; environmental impact assessment; and specification of sustainable materials. Zuo and Zhao (2014) found that research into green buildings has been dominated by issues of energy performance and technology, while Ortiz et al. (2009) describe the importance of life-cycle thinking in determining the sustainability of choices of material and process. Ofori (1998) concluded that to achieve sustainability in construction, we need a paradigm that encompasses both technical action and wider institutional and managerial change. Operational strategies are how design intent is translated to the site, while procurement strategies ensure the sustainability as sumptions carry through the whole supply chain. Organisational strategies such as training; working with regulators; and formal reporting (Opoku and Ahmed, 2014) are what make the other categories of strategy repeatable. Epstein and Buhovac (2014) state that management systems, measurement and reporting are what support sustainability initiatives over time.

Perceived Effectiveness and its Measurement

Perceptions are a common way to evaluate sustainability performance, because project-level information on energy, waste, social, and cost outcomes are seldom collected systematically. Carvalho and Rabechini (2017) discovered that sustainability practices are related to project success, but that there is a moderating effect of project type. Perception-based ratings uncover the overarching patterns of multiple projects, and are influenced by project manager visibility and access to project monitoring data. Measurement schemes such as the balanced scorecard (Kaplan & Norton, 1992) and the indicator systems presented by Epstein and Buhovac (2014) tackle this issue by making linkages between strategic objectives and only a limited number of measures, logic which naturally extends into TBL-based project monitoring. Agarwal et al. (2022) also explore the influence of sustainability in project management practices, using this lens in an emerging-economy context.

The Developing-country Context

Other developing country studies would seem to support this view. Ametepey et al. (2015) have identified organizational and institutional factors that inhibit sustainable construction practice in Ghana, Windapo and Goulding (2015) have identified a gap between legislation and green-building implementation in South Africa, Banihashemi et al. (2017) have highlighted critical success factors that facilitate the incorporation of sustainability into the management of construction projects in the developing world, and those factors include management commitment, education, and enabling regulation. All these studies imply that the technical solution has been found, but the capacity of organizations to institutionalize it is the binding constraint. Whether this is true for project managers in Abuja is the empirical question this paper aims to answer.

Conceptual Framework

The Triple Bottom Line suggests that environmental, social and economic performance should be considered together. A project may reduce energy use yet perform poorly in community engagement or whole-life affordability. Accordingly, sustainability strategies should be assessed against multiple outcome indicators and across project stages. Sustainable project management also requires stakeholder participation and ongoing review rather than one-time compliance at design or construction (Labuschagne & Brent, 2005). The framework used here therefore links four groups of strategies (technical/design, procurement/sourcing, operational/site and organizational/capacity-building) to two sets of perceived results: overall effectiveness, and outcomes across the three TBL dimensions. The professional position of the respondent (for example consulting firm or client organization) is treated as a contextual factor that may influence both adoption and perceived effectiveness.

III. METHODOLOGY

Research Design

The study adopts a quantitative, descriptive, and cross-sectional design. It uses reported findings from the source study's descriptive survey of 220 project managers in the FCT, Abuja, and re-arranges, explains, and visualizes those results in relation to the literature reviewed above. Therefore, it is a secondary synthesis of published descriptive statistics rather than a new data collection exercise.

Study Area and Population

The study area is the Federal Capital Territory, Abuja, Nigeria's capital city. Since large numbers of public infrastructure projects are being delivered on a continuous basis and private real-estate developments are being built, the city creates an enormous and diverse portfolio of construction and urban development projects. Target population(s): projects managers involved in delivering these projects: those employed by consulting firms and those employed by client organizations.

Data and Measurement

The survey gathered responses from 220 project managers, with sampling and administration procedures as described in the original study. Strategy adoption was assessed using ten items across four dimensions: technical/design, operational/site management, procurement/sourcing, and organizational/capacity-building. Overall effectiveness was evaluated using a summary rating and an overall mean, while perceived outcomes were measured with items addressing environmental, social, and economic performance. All items used a five-point Likert-type scale (Likert, 1932), where higher scores reflect greater adoption or more favorable outcomes. For interpretation, mean scores below 2.50 are considered low, scores from 2.50 to 3.49 are moderate, scores 3.50 to 4.49 are high, and 4.50 or above are very high. This approach is maintained here to align with the source's classification of the overall mean of 3.45 as moderate.

Data Analysis

Analysis is descriptive. Reported item means are ranked within and across dimensions, dimension-level means are derived from the un-weighted arithmetic mean of the reported items in a group, and for overall ratings the distribution of percentages is given. The chart for each table gives the corresponding values, and the 'following inference' refers to the appropriate figure. Since only summary statistics are available, no significance tests are performed, and differences are reported as patterns rather than as statistically significant effects.

Validity, Reliability and Limitations

Three caveats govern the discussion of the findings. The first is that the data are perceptions of the particular role of respondent with respect to items and their context (here, personal and professional experience), which may be susceptible to social desirability and common-method variance bias. The second is that the table of outcomes reveals selected indicators rather than the entire set of items available in each scale; this means that the dimension averages based on the table may not match the full dimension scores reported on by the source for their development. Third, the scale's internal consistency reliability is not re-estimated here; measures like Cronbach's alpha (Cronbach, 1951) should be presented along with the first dataset in any subsequent investigation.

IV. RESULTS

This section shows the results in three sections: adoption of strategies, general effectiveness and the TBL process. Each table is followed by a chart with the same information and an inference which refers to both.

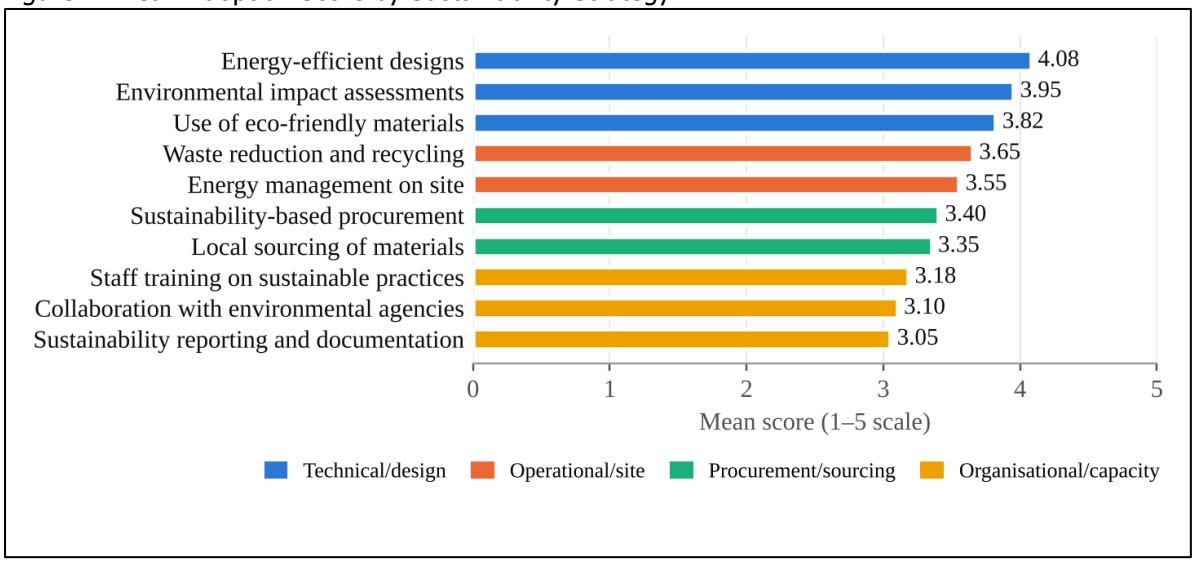
Strategy Adoption

Table 1: Strategy Adoption

Strategy dimension	Reported strategy	Mean score
Technical/design	Energy-efficient designs	4.08
Technical/design	Environmental impact assessments	3.95
Technical/design	Use of eco-friendly materials	3.82
Operational/site	Waste reduction and recycling	3.65
Operational/site	Energy management on site	3.55
Procurement/sourcing	Sustainability-based procurement	3.40
Procurement/sourcing	Local sourcing of materials	3.35
Organizational/capacity	Staff training on sustainable practices	3.18
Organizational/capacity	Collaboration with environmental agencies	3.10
Organizational/capacity	Sustainability reporting and documentation	3.05

Source: Authors' Analysis, 2026

Figure 1: Mean Adoption Score by Sustainability Strategy



Source: Authors' Analysis, 2026

Technical and design solutions dominate the reported profile, while training of staff, collaboration and reporting are weak (Table 1, Figure 1). Bearing in mind the averaging across different measures, the dimension means are 3.95 for technical/design, 3.60 for operational/site, 3.38 for procurement/sourcing and 3.11 for organizational/capacity building, a difference of 0.84 points between the strongest and weakest groups. The three bars in Figure 1 which are closest to the top of the scale all relate to technical measures, and the three shortest bars relate to organizational measures. However, none of the scores falls below the mid-scale value of 3.00 so, in relative terms, these areas are under-represented rather than totally absent.

It does, however, raise the question of whether project teams will be more likely to carry out visible design and site practices or will more generally embed sustainability into organizational processes, procurement, and reporting. This is in line with the view that the most challenging and time-consuming components of sustainability management are leadership, training and measurement (Epstein & Buhovac, 2014; Opoku & Ahmed, 2014).

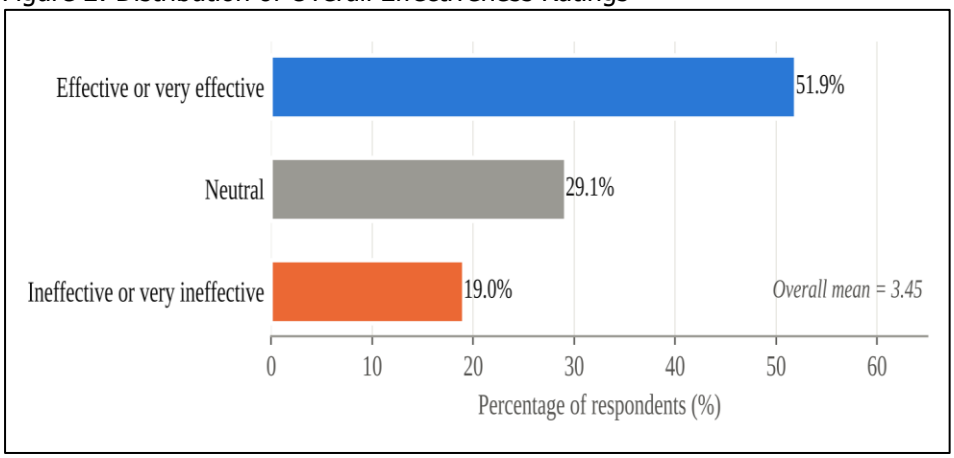
Overall Effectiveness

Table 2: Overall Effectiveness

Overall Rating	**Percentage of Respondents**
Effective or very effective	51.9%
Neutral	29.1%
Ineffective or very ineffective	19.0%
Overall mean score	3.45

Source: Authors' Analysis, 2026

Figure 2: Distribution of Overall Effectiveness Ratings



Source: Authors' Analysis, 2026

Slightly more than half of respondents considered current practices effective or very effective, while almost one-third expressed neutrality and nearly one-fifth indicated ineffectiveness (Table 2; Figure 2). Positive ratings exceeded negative ones by approximately 2.7 to 1, resulting in a net margin of 32.9 percentage points. However, 48.1% of respondents either withheld endorsement of effectiveness or rated it as ineffective. The source describes the overall mean score of 3.45 as indicating moderate effectiveness, which aligns with the distribution depicted in Figure 2.

The neutral share could be caused by ambiguity about the nature of measurement, or experience throughout the project. This interpretation supports the general trend that perception-based judgments are responsive to availability of monitoring data (Carvalho & Rabechini, 2017) and might support the later suggestion of establishing baselines for post completion measurement.

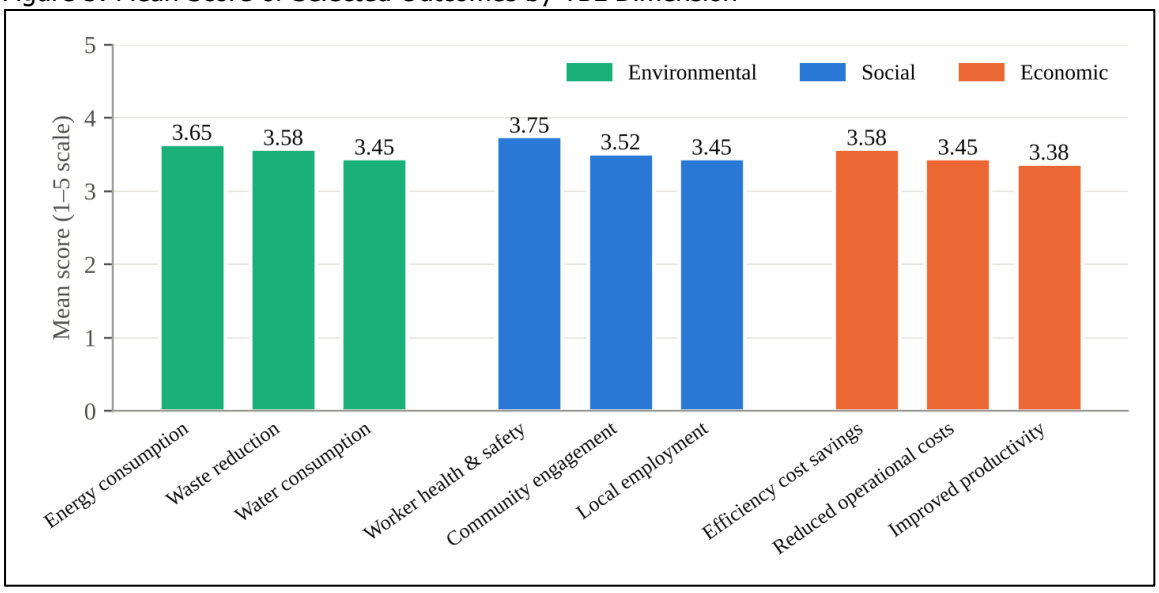
Triple Bottom Line Outcomes

Table 3: Triple Bottom Line Outcomes

Outcome Dimension	Selected Reported Outcome	Mean Score
Environmental	Reduction in energy consumption	3.65
Environmental	Waste reduction	3.58
Environmental	Reduction in water consumption	3.45
Social	Worker health and safety	3.75
Social	Community engagement	3.52
Social	Local employment	3.45
Economic	Cost savings from efficiency measures	3.58
Economic	Reduced operational costs	3.45
Economic	Improved productivity	3.38

Source: Authors' Analysis, 2026

Figure 3: Mean Score of Selected Outcomes by TBL Dimension



Source: Authors' Analysis, 2026

The announced results demonstrate a moderate level of achievement in all three factors (Table 3; Figure 3). Among the three factors, worker health and safety receives the highest value of selected score, followed by energy savings and efficiency cost savings, then improved productivity with 3.38. The average value of selected indicators is 3.56 for environmental impact, 3.57 for social impact and 3.47 for economic impact, and the difference between the highest and the lowest factor is only 0.37. This means some well-known operation controls and their immediate result of energy efficiencies may be easier to be noticed than most of other effects.

The social bars in Figure 3 also demonstrate that outcomes involving only those within the project team (worker safety, 3.75) rated higher than those involving outside stakeholders (community engagement, 3.52; local employment, 3.45). The source identified overall effect scores of 3.40

(environmental), 3.38 (social) and 3.24 (economic). While these dimension scores can't be directly compared with the averages of selected indicators above, both sets show the economic dimension most poorly represented, perhaps confirming the assertion that economic gains of sustainability are the most difficult to prove (Slaper & Hall, 2011).

Variation by Professional Group

According to the source, the average overall strategy adoption was highest for consulting-firm project managers and lowest for client-organisation project managers. Consulting-firm project managers also reported the highest overall strategy effectiveness while client-organisation project managers reported the lowest overall strategy effectiveness. As the source reports slightly different mean values in its detailed discussion and summary for some group comparisons, group means are not tabulated here but need to be reconciled with original sources before publication. The overall pattern is described as higher reported use of strategy and higher reported effectiveness for consulting-firm project managers.

V. DISCUSSION

The results indicate a disparity between technical implementation and organizational institutionalization. Energy-efficient design and environmental impact assessment are relatively well represented, while sustainability reporting and staff training receive lower scores. This reflects findings from other developing economies, where challenges are more often organizational and institutional than technical (Ametepey et al., 2015; Banihashemi et al., 2017), and it supports the view that integration requires attention to people, processes, and systems in addition to technology (Marcelino-Sádaba et al., 2015). In the absence of reporting, it is difficult to show whether intended actions have led to measurable improvements in performance. Without staff development, practices may rely on individual expertise rather than become established organizational routines.

Moderate effect sizes should also suggest the importance of moving the focus from activity as a proxy for outcomes. (A project that just says "specifies efficient equipment" is not sure that energy use actually decreased there needs to be a baseline, a goal, someone responsible, and measurements once it's completed). Waste diversion, community satisfaction, local employment, worker health and safety, and whole-life costs work the same way.

A Triple Bottom Line (Kaplan & Norton, 1992; Elkington, 1997) aligned balanced scorecard provides the metrics the project team can track over the life cycle. The environmental metrics include water and energy consumption, waste to landfill and emissions; the social metrics include safety records, local jobs created, access to the project and stakeholder feedback; and the economic metrics includes life-cycle costs, maintenance costs, value of improvements in efficiencies and productivity, and savings. The metrics in each category would be appropriate for each project and measured on a similar basis.

Implications for policy and practice The implications for policy and practice are in the value of regulatory and professional incentives for reporting and capacity-building, in addition to design standards compliance. For the 'disconnect' between regulation and practice (Windapo & Goulding, 2015), it appears that client organizations, which had the lowest uptake, are empowered to influence client practices via procurement specifications and contractual terms. The study's limitations, referring to self-reported perceptions, and descriptive statistics, require these inferences to be challenged using project-specific performance data.

VI. RECOMMENDATIONS AND CONCLUSION

Technical and operational sustainability practices are seen by project managers in Abuja. Organizational support practices are not as widely reported, with moderate perceived effectiveness. Results suggest a movement away from isolated practices to integrated sustainability management. Proposed practices are:

Need a plan for sustainability and data to measure progress when the project starts
Embed sustainability considerations into the procurement process, consideration of suppliers and contract management
Provide regular staff training and formal collaboration with environmental agencies
Maintain a sustainability register and report progress at project milestones
Establish baseline and post-completion measurements for environmental, social and economic outcomes

Use lessons learned for future projects.

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