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Integrating Sustainability into Project Management Practices: Experiences of Managers in Infrastructure Projects

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Abstract

This study explores the integration of sustainability principles within the project management practices of infrastructure projects, drawing upon the experiences of fourteen project managers. The research employs semi-structured interviews and manual thematic analysis to examine how sustainability is conceptualized, operationalized, and aligned with project objectives. The analysis reveals four core themes: (1) the conceptualization of sustainability in practice, (2) organizational culture and structural enablers, (3) challenges and tensions encountered during implementation, and (4) strategies for aligning sustainability with project performance. The findings indicate that while there is widespread awareness of sustainability, its practical application remains fragmented due to factors such as cost considerations, lack of expertise, and inadequate regulatory frameworks. Leadership advocacy, collaborative learning, and early-stage planning emerge as critical success factors in the integration process. This research underscores the importance of incorporating sustainability into organizational strategies, technological platforms, and capacity-building initiatives to ensure long-term impact. Furthermore, the study contributes to both theory and practice by highlighting the interplay between managerial agency and organizational culture in transforming sustainability objectives into tangible project outcomes.

Keywords: Sustainability Integration, Project Management, Leadership, Infrastructure Projects, Organizational Culture, Sustainable Development.

Introduction

Background of the Research

The increasing need for sustainable infrastructure has redefined the project management environment throughout the world by compelling organizations to incorporate environmental, social, and economic issues in all stages of project delivery (Elhamahmy et al., 2025). Infrastructure projects, especially, are a significant source of carbon emissions as well as resource use and social impact in the world. Lou et al. (2025) suggest that a vast share of the total global greenhouse gas emissions increase is provided by infrastructure development, which explains the urgency of introducing sustainability principles to the practice of project management. Sustainable infrastructure is not only a moral obligation but also a strategic requirement because governments, investors, and communities are becoming more and more accountable and resilient to the development efforts (Alnsour et al., 2024). Elsewhere, in Europe and Asia, the concept of

sustainability is included in the procurement systems and design procedures, which makes project managers reconsider the established patterns of planning, implementation, and assessment (Silvius et al., 2025). Practically, sustainability in the context of project management entails applying the concepts of ecological responsibility, efficiency in project resources, and equity to the project life cycle (Alemu, 2025). Such an integration requires the balance between the cost, time, and quality goals and sustainability indicators, such as carbon reduction, waste reduction, and inclusivity to the stakeholders (Stanitsas et al., 2021). The construction and infrastructure sectors are especially confronted with the problem of the impossibility to actualise these goals due to their scale, complexity and long-term impacts on the environment and society. According to Sandanayake et al. (2022), the percentage of sustainability criteria stated in project charters by 40% of infrastructure projects in Australia has been increasing despite the increased institutional awareness and education. Similarly, Moshood et al. (2023) discovered that the principles of sustainability are rather considered as secondary factors to be considered instead of being mandatory decision-making parameters. Current developments in sustainable technologies, such as green materials, circular economy models, and digital tools, have provided new opportunities to enable project managers to achieve sustainability goals more successfully (Rusch et al., 2023). Ogunmakinde and others (2022) stressed that the circular economy has the potential to increase the achievement of the UN Sustainable Development Goals through less dependency on resources and stimulating innovative reuse of resources in the construction processes. Furthermore, Jariwala (2024) revealed the effectiveness of the integration of artificial intelligence in making decisions and in providing predictive analysis of risks focused on sustainability. Such technological changes underscore the fact that sustainable project management is taking the multidisciplinary route that necessitates technical expertise as well as a sense of strategic visioning.

Problem Statement

Although the focus on sustainability is growing, the practical application of sustainable practices in project management is not even across infrastructure projects. Most project managers accept the significance of sustainability; however, they have a hard time operationalizing it due to clashing priorities, poor frameworks, and inadequate institutional support. Soares et al. (2024) argue that most sustainability efforts are usually adopted independently of the primary project management activities, leading to disjointed results and inefficiencies. Such a discrepancy between theory and practice is especially apparent in infrastructure projects, where the environmental, social, and economic aspects overlap with multi-layered stakeholder relationships and regulatory forces (Ahmed et al., 2025; Khan et al., 2025). Further, there is scant empirical information regarding how managers experience and feel the incorporation of sustainability into an infrastructure context. This sets a great urgency in seeking the lived experiences of project managers who have navigated these complexities, their approaches, and the contextual implications that cause them to embrace sustainability effectively (Ahmed et al., 2025; Rehmat et al., 2025).

Research Questions

1. What are the lived experiences of project managers when it comes to including sustainability in the practice of managing infrastructure projects?
2. What are the perceptions of the project managers towards the challenges and enablers of sustainability integration in infrastructure projects?
3. How do project managers synchronise sustainability goals with project performance goals in infrastructure development?

Research Objectives

1. To investigate the experiences of project managers in integrating the concept of sustainability into the practices related to the management of infrastructure projects.
2. To determine the significant barriers and enablers that affect the successful incorporation of sustainability in infrastructure projects.
3. To study how the managers are applying their strategies to ensure that sustainability goals are aligned with the project performance outcomes.

Significance of the Research

The current research will contribute to the existing body of knowledge on sustainable project management through the provision of empirical evidence from practitioners in infrastructure projects. Although earlier research, like Ferrarez et al. (2023) and Orieno et al. (2024), investigated the frameworks and theoretical models, there is still no qualitative data on managerial views on sustainability integration in the reality of operations. The results have significant implications for policymakers, teachers, and institutions that aim to equip project managers with sustainability skills. The explanation of how managers experience and respond to challenges associated with sustainability can be helpful in designing more functional frameworks, professional training programs, and policy interventions that align sustainability principles with project management approaches (Alemu, 2025). Also, the study contributes to the theory and practice in the area of project management by expanding the academic knowledge of the operationalisation of sustainability in large-scale projects. The research design employed in this study is a qualitative research study based on interpretivism and investigates the way project managers view sustainability and incorporate it in infrastructure projects. Fourteen project managers who have headed medium to large-scale infrastructure projects in different parts of the world underwent semi-structured interviews. The selection of the participants was intentional in order to represent a variety of experiences and organizational backgrounds. The records were coded and analysed through thematic analysis in order to determine the recurrent patterns, themes, and interpretations about the views of the participants. It was an experience-based analysis rather than statistical generalisation since there was a need to have a depth of knowledge on processes and issues surrounding sustainability integration. Strict ethical considerations were practiced, which included informed consent, confidentiality and voluntary participation.

Literature Review

Theoretical Framework

The theoretical perspectives that inform the sustainability integration of the project management practices encompass the idea of how organizations and individuals incorporate and institutionalise sustainable behaviour (Zada et al., 2024). The Triple Bottom Line (TBL) theory is among the most relevant ones based on the considerations of the environmental, social, and economic objectives in decision-making. According to Stanitsas et al. (2021), project managers can apply the framework of TBL in case they desire to assess the success of the project based on its cost, time, and scope, but also on its ecological footprint and social equity. The TBL provides a theoretical model of assessing the trade-offs in infrastructure development wherein financial gains of infrastructure development are often conflicting with the long-term benefits of environmental sustainability. The Stakeholder Theory also helps in justification of the necessity to include sustainability in project management with TBL. Stakeholder involvement as Silvius et al. (2025) observe is crucial in ensuring that the project objectives and the values of sustainability are in line since different stakeholders are affected by and have impacts on decisions made on projects, such as governments, communities, and investors. The project managers are identified to be the facilitators to this theory who must balance different and even competing demands in the creation

of sustainable infrastructure. Along with these frameworks is the Institutional Theory, which explains the impact of regulatory forces, such as industry standards and cultural desires, on sustainability practices (Ebrahimi & Koh, 2021). According to Soares et al. (2024), institutional forces often drive project managers to adopt environmentally friendly practices to comply with environmental regulations and meet other organizational legitimacy needs. However, compliance does not always lead to deep integration; the theory also emphasizes the role of normative and mimetic pressures in influencing managerial behaviour and organizational adaptation (Ali et al., 2025). Systems Theory offers an integrated perspective on sustainability, viewing projects as multi-systems with interdependent components (Rabbi, 2025). Lou et al. (2025) reasoned that the systemic coordination of the design, construction, and operational phases in the infrastructure sector determines sustainability outcomes. Systems thinking motivates project managers to consider the long-term dynamics of physical infrastructure, social systems, and ecological cycles. Altogether, these theories provide a conceptual framework for integrating sustainability into project management practices while managing competing priorities and systemic constraints (Arzu et al., 2025; Khuharo et al., 2025; Zeb et al., 2025).

Sustainability Integration and Project Management Practices

This involves including sustainability in the management of projects, whereby environmental and social factors need to be entrenched in each stage of the project, such as initiation, planning, execution, and closure. Soares et al. (2024) noted that businesses are becoming more committed to considering sustainability as a competitive asset and not a peripheral addition to the operations of a project. Yet, its practical application is still disjointed due to the absence of standardized frameworks. According to Ferrarez et al. (2023), project managers often encounter ambiguity when determining sustainability indicators that can be applied to their project scope. This contradiction undermines the measuring of performance and the justification of sustainability investments. Moshood et al. (2023) investigated the concept of sustainability within the context of infrastructure project delivery and concluded that strategic alignment is an essential factor in determining successful incorporation. Projects can attain better performance results when sustainability objectives are clearly articulated in project charters and procurement plans (Ershadi et al., 2021). On the other hand, when the concept of sustainability is a post-thought approach, it is fraught with inefficiencies, cost escalation, and reputational risks. In this context, Jabbar and Gul (2026) emphasized the importance of aligning sustainability goals with organizational values and project performance metrics. Similarly, Asif et al. (2026) highlighted the need for organizational commitment to sustainability, as leadership and employee involvement play critical roles in supporting sustainable decision-making (Baig, Tufail, & Baig, 2021).

Furthermore, the report by Silvius et al. (2025) has established that project management based on sustainability requires a cultural shift in organizations, where leadership commitment and employee involvement will support sustainability decisions. Systematic implementation has been enabled by adopting sustainability frameworks, including ISO 14001 and the Global Reporting Initiative (GRI) (Fonseca et al., 2023). However, Lou et al. (2025) observed that adherence to such requirements is not sufficient to guarantee the integration of sustainability. Instead, project managers must convert these frameworks into project-specific operational strategies. Hanif et al. (2026) reinforced that the process of transforming adherence to procedural standards into strategic integration differentiates mature, sustainable project management practices from symbolic or superficial efforts. Rehmat et al. (2025) further emphasized the importance of ensuring that sustainability practices are embedded at the core of project execution to achieve long-term success (Ullah & Khattak, 2018).

Environmental Sustainability in Infrastructure Projects

The ecological aspect of sustainability is aimed at mitigating the environmental impact of infrastructure projects in terms of energy consumption, minimization of waste, optimization of materials, and other related factors (Nwaogbe et al., 2025). Sandanayake et al. (2022) noted that a key concept in project management education and practice is environmental sustainability, especially in the construction industry, where most activities are resource intensive. Their analysis of Australian higher education programs demonstrated that sustainability education has not been made consistent, and many project managers are not adequately prepared to handle the environmental dynamics of contemporary infrastructure development. In addressing such issues, Lou et al. (2025) compared two European megaprojects and found that including environmental assessments during the design phase resulted in significant carbon reductions over the lifecycle. The authors highlighted that early incorporation of environmental sustainability measures allows for more informed decisions, especially concerning materials and energy systems. Similarly, D'Angelo et al. (2023) demonstrated that green manufacturing and sustainable material investments reduce environmental impact while enhancing financial performance by increasing resource efficiency. Nevertheless, to achieve environmental sustainability, institutional and operational obstacles must be overcome. According to El-Sayegh et al. (2021), environmental risks are often inadequately addressed in risk identification and assessment during sustainable construction projects due to a lack of data and short-term project priorities, which neglects the ability to project ecological impacts. In contrast, Ogunmakinde et al. (2022) suggested that the principles of the circular economy (reuse, recycling, and converting waste into resources) are key instruments for aligning construction activities with the environmental sustainability agenda. These practices reduce reliance on virgin materials and promote the use of regenerative resources. Moreover, Navaratnam et al. (2022) emphasized that prefabrication can contribute to sustainability by reducing waste in construction and energy consumption. However, the integration of prefabricated technologies remains slow due to high initial investment costs and industry resistance to change (Liu et al., 2025). This underscores the need for organizational transformation and favourable policy models to drive sustainable construction. In the literature, it is evident that the sustainability of environmental issues in infrastructure projects relies on both managerial capability and organizational support mechanisms that encourage green innovation (Malik et al., 2026; Rehmat et al., 2025; Hole, 2024).

Economic and Operational Dimensions of Sustainability

Project management economic sustainability is not only profitable but also cost-effective, risk-averse, and focused on value creation in the long term. D'Angelo et al. (2023) justified that sustainable operations can help businesses increase competitiveness through waste reduction, improved resource utilization, and appeal to socially aware investors. Nevertheless, a conflict arises between short-term financial goals and long-term sustainability gains in most infrastructure projects. Moshood et al. (2023) argued that decision-makers often prioritize cost-related considerations over environmental or social impact, causing sustainability programs to be overlooked. Silvius et al. (2025) pointed out that incorporating sustainability requires redefining project success criteria to include economic resiliency, resource cyclability, and lifecycle costing. This change necessitates project managers using multi-criteria decision-making models that consider both hard and soft returns. Negri et al. (2021) supported this by suggesting that supply chain resilience and sustainability are complementary aspects that guarantee the continuity of resource movement and project delivery. Projects in infrastructure that incorporate resilience into sustainability models are more resistant to economic and environmental shocks, such as material shortages or policy changes. Similarly, Avotra et al. (2021) attributed economic sustainability in green buildings to corporate social responsibility (CSR) initiatives. They found that organizations

incorporating CSR into their project planning not only enhance stakeholder trust but also achieve operational economies of scale and market differentiation. Additionally, Baloch et al. (2023) investigated the tourism infrastructure domain and demonstrated that sustainable development increases the competitiveness of destinations without negatively impacting environmental quality. This implies that sustainability principles can be applied across various infrastructure sectors. Operationally, Waqar et al. (2023) showed that implementing digital innovations in construction management, such as passive RFID technology, enhances traceability and resource optimization. These digital solutions provide real-time data, helping managers better handle materials and minimize wastage. This integration of sustainability and technology, therefore, offers a viable solution for achieving economic efficiency and environmental accountability. However, Jariwala (2024) observed that technological implementation should be supported by human capability and vision to achieve accurate sustainability results (Arzu et al., 2025; Ashraf et al., 2025; Rehmat et al., 2025; Kausar & Ahmed, 2026).

Social and Ethical Dimensions of Sustainability

Social sustainability aims at ensuring equity, inclusivity, and community well-being in project scenarios. Ferrer-Estévez and Chalmeta (2021) discussed that sustainable development must be based not only on environmental care but also on human-oriented policies that facilitate education, participation, and the creation of shared values. In the context of infrastructure development, social sustainability implies the involvement of local communities, the safety of workers, and the minimization of the effects of displacement (Vijayakumar et al., 2022). According to Silvius et al. (2025), collaboration between stakeholders is a key facilitator of social sustainability, and it is necessary to establish clear communication and involve others in decision-making. Ferreira et al. (2023) observed that Brazilian project managers perceive ethical leadership as part of sustainability integration, which builds trust and accountability among team members and external partners. On the same note, Orieno et al. (2024) revealed that managers who advocate inclusivity and justice are more likely to achieve greater success in meeting project goals and expectations within the community. However, they added that social sustainability is not well-covered in formal project management programs, which limits practical guidance for managers.

According to El-Sayegh et al. (2021), the social risks of sustainable construction should incorporate labor risks, community dissatisfaction, and health impacts. These aspects are susceptible to undermining the project's legitimacy and causing reputational harm, which often goes unaddressed. Moreover, Abu-Rayash and Dincer (2021) proposed the introduction of integrated sustainability performance indicators that assess not only the technical and economic performance but also social well-being as part of the performance evaluation of the project. These findings are crucial because, without ethical responsibility and social interaction grounded in decisive leadership and organizational culture, sustainability cannot be achieved (Byrne, 2022; Braun et al., 2022; Rehmat et al., 2025; Asif et al., 2026).

Technological Innovations and Sustainable Project Management

Technological innovation plays a significant role in the acceleration of the process of sustaining sustainability. Jariwala (2024) discovered that artificial intelligence can also be applied to be involved in the sustainability process by anticipating the risks associated with a project, allocating resources in the most effective way, and monitoring the performance by sustainability metrics. These applications can help in the transparency and figure-based decision making thereby allowing the managers to keep an eye on sustainability indicators within the project life cycles. Likewise, Waqar et al. (2023) demonstrated the effectiveness of passive RFID systems in boosting the productivity of small-scale construction projects and provided a scaled model of the system to larger infrastructure projects. Digitalisation also helps to promote sustainability by allowing

predictions in maintenance, eliminating wastage of materials, and delaying project completion (Enyejo et al., 2024). Nonetheless, Ferrarez et al. (2023) warned that technology in itself is not sufficient to be made sustainable without its complex with other elements of a larger strategic framework, including human skills, ethical issues, and organizational backing (Khan, et al., 2021). Lou et al. (2025) stressed that the use of digital twins and real-time data analytics would allow improving environmental performance in infrastructure projects, simulating the use of energy and waste production before its application. On the same note, Negri et al. (2021) have noted that the implementation of digital sustainability monitoring tools in supply chains increases resilience and efficiency. However, technological adoption, according to Soares et al. (2024), is not evenly spread among the organizations and is mainly caused by financial issues and a lack of technical knowledge. Technology is supposed to be regarded as a facilitator and not a replacement for sustainability-oriented leadership and governance.

Gaps in Existing Research

Although interest in the subject has increased academically, there are still a number of gaps in the literature. First, numerous studies, such as Orieno et al. (2024) and Stanitsas et al. (2021), focus on the conceptual frameworks, but there is limited empirical information about practitioners. The understanding of how project managers perceive and feel about the integration of sustainability in infrastructure projects is lacking. Second, the majority of the literature on this topic concentrates on developed economies, including Europe and Australia, with a scarce comparative outlook in developing economies where infrastructural growth is gaining momentum (Navaratnam et al., 2022). Third, technological innovation as a sustainability strategy is a well-studied topic, but its practical relationship with organizational culture and leadership has not been adequately explored (Jariwala, 2024). Furthermore, existing literature emphasizes that sustainability frameworks are available but their use is inconsistent across various stages of a project. Another significant gap is the lack of qualitative evidence on how managerial attitudes, decision-making dynamics, and pressure from stakeholders determine the integration of sustainability. The available literature, therefore, highlights the need for a practical, empirical understanding of how project managers operationalize sustainability principles under organizational constraints and industry challenges. By addressing these gaps through qualitative inquiry, both the theoretical and practical understanding of sustainable project management in infrastructure development can be significantly enhanced (Khan et al., 2025; Kausar & Ahmed, 2026; Rehmat et al., 2025).

Methodology

Research Design

The study method was qualitative research (Braun & Clarke, 2017) founded on an interpretivism paradigm to learn the lived experiences of the project managers regarding the topic of implementing sustainability in infrastructure project management. The decision to use this design was informed by the fact that it concentrates on subjective meanings, subjective interpretation, and knowledge that depends on the context in comparison to numerical generalisations. The argument of Silvius et al. (2025) is that the process of the sustainability of project management is a complex social process because it is a matter which relies on a particular person, organizational culture, and institutional structure. Thus, qualitative inquiry gave a chance to obtain deep understanding of these interrelated aspects in the context of rich and descriptive stories.

The research has relied on semi-structured interviews in a bid to bring out different perceptions towards the concept of sustainability. This design also assisted in bending it, because the respondents could elaborate the experiences and provide contextual examples which could be applied to the organizational and project context. Lou et al. (2025) emphasised that the concept of sustainability in infrastructure projects is more likely to be developed in adjustive processes, rather

than in consistent ones, and, thus, should be studied in an interpretive way. Semi-structured interviews were used; this gave us the chance to probe and clarify and also gave us consistency among the participants. The phenomenological orientation was required because the study was aimed at examining how the sustainability principles can be incorporated into the project management practices. This orientation aimed at identifying the meanings of sustainability as perceived by project managers and the manner in which the same led to their professional behaviours. The design was also consistent with Moshood et al. (2023), who emphasised that to understand the sustainability implementation in project management, it is essential to study how practitioners conceive sustainability goals in practice, but not just the organizational policies.

Sampling Strategy

The individuals selected through a purposive sampling strategy are those who have had first-hand experience in management of infrastructure projects that have considered sustainability issues. Eleven project managers were selected as the sample, and they were in various fields which included transportation, energy and construction. The organizations that have employed the sustainability frameworks, such as the ISO 14001, or adhered to the local sustainability building standards were the sample recruiters. This sampling methodology assisted in ensuring that the respondents possessed the right knowledge and some practical experience in the aspect of implementation of sustainability. The criteria applied to select the participants were pegged on three characteristics: (1) at least five years of experience in project management, (2) direct involvement with no less than one infrastructure project with sustainability aspects, and (3) employment within firms with sustainability goals and pursuing them actively. Ferrarez et al. (2023) state that the perception of sustainability imperatives depends on the experience of a professional by managers, and thus, experienced professionals may become one of the critical sources of information. The sample was also designed to be diverse in the organizational settings and types of projects to get a range of organizational situations. Participants were both the public and the private managers, which provided the opportunity to draw the comparison between the regulatory-driven and the market-driven approaches to sustainability. The fourteen sample respondents utilised in the research were considered adequate to undertake qualitative research because the small and narrow samples can be profound and rich in thematic analysis (Soares et al, 2024). The recruitment procedure followed through professional networking and introduction and all the subjects were voluntarily involved in the study after a clear explanation of the purpose of the study and ethical concerns.

Data Collection

The data gathering technique was semi-structured interviews, during which the lives, difficulties, and strategies of the respondents towards the introduction of sustainability in the administration of the infrastructure projects were examined. Each of the interviews lasted between 60 and 90 minutes, and they were either face-to-face or done via videoconferencing of secure video communication sites, where the respective participants could be found and were geographically spread. The interview guide has been created based on the themes that have been identified in the process of reviewing the literature including sustainability frameworks, stakeholder engagement, and barriers to implementation. Elaborative and reflective answers were obtained using open-ended questions. To illustrate the same, the respondents were asked to provide the manner the sustainability goals were set and managed in their projects, the challenges they encountered during their projects, as well as how the sustainability goals were aligned with the cost and performance indicators. According to Orieno et al. (2024), the qualitative data is more likely to be valid with the assistance of open-ended questioning because the respondents get a chance to disclose their life experience in their native language. The interviews were tape-recorded and properly

transcribed to ensure the accuracy of data throughout the whole interviews with the consent of the interviewees. The data collection process will take place until thematic saturation, where no further information came during the interviewing process, and this corresponds to the notion of qualitative saturation that has been defined by Stanitsas et al. (2021).

Data Analysis

The analysis was conducted through thematic analysis (Braun & Clarke, 2022), which helped to identify and interpret repeating themes and patterns among the transcripts of the interviews in a systematic way. This analysis method corresponded to the conceptual steps of familiarisation, coding, theme development and interpretation developed by Braun and Clarke, but the analysis procedure was not automated with the use of software. First, the transcripts were read repeatedly to have immersion in the data. Significant units of text were given preliminary codes, based on the concepts associated with the sustainability challenge, the approaches of management, or the institutional pressures. The coding was done inductively, whereby the themes were organically developed out of the narratives of the participants and were not preset. Inductive analysis, as emphasised by Lou et al. (2025), provides a beneficial approach in reflecting the complexity in the sustainability integration of various project situations. Similar codes were subsequently merged into larger categories, which became the major themes in the study. Correlations between these themes were studied and found to be interrelationships between organizational culture, project management practice, and sustainability outcomes. The flexibility of this process assisted in maintaining the process interpretation grounded on the lived experiences of the research subjects and, simultaneously, maintaining it as a theoretical process with the conceptual grounding of the research. Reflexivity was involved in the process of analysis. The researcher maintained an interpretative journal throughout the interpretation of the data to capture the biases, assumptions, and decisions to make the research transparent and analytically rigorous. Since reflexivity, as Ferrarez et al. (2023) propose, increases credibility, the researcher admits the impact of their influence on the interpretation of the data. Themes were tested by comparing them across every participant and re-interpreting the information to ensure that there was consistency and representativeness.

Ethical Considerations

Ethics were strictly followed during research. All respondents provided their consent to participate in the data collection, and that was voluntary. All subjects were provided with an extensive information sheet of the objectives of the study, confidentiality and the option of dropping out at any point with no consequences. The anonymity of the information participants and organizations ensured confidentiality. The respondents were given pseudonyms, and no identifiable information was used in transcripts and reporting. All the information was kept safely in the encrypted files accessible to the researcher only. Ahead of data collection, the institutional review board had to approve the studies, and this approval was made ethical. The professional and personal boundaries of the participants were respected, mainly because the discussions concerned the organizational policies and management issues. Discretion was applied in the handling of sensitive information in order to avoid possible reputational or professional damage. This study was conducted following ethical principles of respect, beneficence, and justice; all the participants were treated equally, and their input was faithfully and respectfully reported.

Participants' Profile

The sample size was representative of an equal proportion of both genders, experience in the profession, as well as sectoral representation. The majority of the participants were in senior managerial roles and were therefore able to make holistic reflections on the strategic and

operational aspects of sustainability. The multiplicity of the types of projects, including renewable infrastructure and urban development, gave different contexts in which sustainability was understood and implemented. Using interpretive design, purposive sampling, and thematic analysis has offered an adequate methodological coherence and depth in the sense that the subtle study of how project managers feel sustainable integration to the infrastructure projects is obtained. The methodological rigour was it and it was the combination with the observation of the ethical standards that increased the validity and reliability of the findings and provided a solid foundation to the subsequent thematic analysis and discussion.

Table 1: *Participant Profiles*

Participant	Gender	Experience (Years)	Sector	Role	Project Type	Sustainability Focus
P1	Male	15	Public	Senior Project Manager	Transport Infrastructure	Carbon reduction, renewable energy
P2	Female	10	Private	Project Engineer	Water Management	Resource efficiency
P3	Male	12	Public	Construction Manager	Energy Infrastructure	Green materials
P4	Female	8	Private	Project Coordinator	Smart City Development	Digital sustainability
P5	Male	20	Public	Project Director	Highway Expansion	Environmental compliance
P6	Female	7	Private	Project Manager	Building Construction	Waste minimisation
P7	Male	11	Public	Sustainability Officer	Urban Redevelopment	Stakeholder engagement
P8	Male	14	Private	Program Manager	Energy Transition	Lifecycle costing
P9	Female	9	Public	Environmental Planner	Bridge Construction	Risk mitigation
P10	Male	18	Private	Senior Consultant	Renewable Infrastructure	Green innovation
P11	Female	13	Public	Project Manager	Flood Control	Social inclusion
P12	Male	6	Private	Design Engineer	Prefabrication Project	Circular economy
P13	Female	10	Public	Project Analyst	Rail Development	Sustainability assessment
P14	Male	17	Private	Senior Project Lead	Port Expansion	Supply chain resilience

Findings and Discussion

Thematic analysis of the data collected in the interview came up with four key themes that, in totality, summarise the experience of project managers when considering sustainability in the management of infrastructure projects. These themes are: (1) conceptualisation and meaning of sustainability in practice, (2) organizational culture and structural enablers, (3) challenges and tensions in implementing sustainability, and (4) strategies for aligning sustainability with project performance. All the themes represent subtle insights based on the lived experience of the managers and show how the concept of sustainability integration can be influenced by institutional, technical and cultural aspects in the infrastructure landscape.

Theme 1: Conceptualisation and Meaning of Sustainability in Practice

The project managers showed a complex concept of sustainability that has been developed through organizational policies and client expectations, as well as professional experience. Although the participants always related sustainability with environmental protection and efficiency, there were those who also defined it in social and economic terms. It was found that sustainability was viewed not so much as an abstract concept but rather as a practical factor that has to align with the deliverables of the project. One of the managers remarked: "Sustainability, for us, is about building responsibly like reducing waste, ensuring long-term asset value, and improving community welfare at the same time". Silvius and Schipper (2023) stated that sustainability is no longer a marginalised notion, but a pragmatic management paradigm that has empowered project decision-making at various levels. The interviews, however, suggested that there was a tendency to understand sustainability on a project basis. For example, managers in the public-sector projects focused more on social inclusion and accessibility, and project managers in the private infrastructure projects focused more on lifecycle cost minimisation and carbon reduction. The difference herein highlights the contextuality of sustainability in the sense that it is not a global standard but an agreed practice that depends on sectoral interests.Furthermore, a number of the respondents speculated on the increased institutionalisation of sustainability measures using systems, like the LEED certification, BREEAM and national green-building standards. However, they also raised some fears that these certifications reduce sustainability to a mere compliance practice or, rather, transformative practice. This is similar to the observation made by Eskerod and Huemann (2023) that the practice of sustainability is prone to being superficial in cases where symbolic legitimacy takes precedence in an organization rather than actual presence. The theme also identified that sustainability is emerging as an ethical obligation that is mixed with the outcomes of the project by managers. Participants expressed that the projects should be able to benefit future generations, which demonstrates that the participants have a sense of intergenerational equity. However, they also admitted that the process of translating such ideals into working terms is not an easy task. The inconsistency in conceptual understanding is an indication of the present situation in sustainable project management practice, whereby individual interpretation of information usually serves to cover gaps created by missing organizational frameworks.

Theme 2: Organizational Culture and Structural Enablers

Organizational culture proved to be a decisive reference point to the extent of the extent to which sustainability was incorporated in project processes. The respondents indicated that leadership commitment, teamwork and sharing of knowledge were the most influential factors that influenced the success of sustainability initiatives. The other theme that was shared by the interviewees was that the challenge of incorporating sustainability would require a cultural shift rather than changes in procedures. One respondent noted: "Sustainability is not enough, only being in the project charter, but should be in the DNA of the company". This is in agreement with the evidence that

Stanitsas et al. (2021) provide in terms of the role of internal culture in facilitating sustainability through learning, empowering, and a shared vision. Sustainability was not an externality of the companies that developed open communication and treated it as a value in the business, which made them more likely to have a more effective result. As an enabler, the presence of sustainability champions (senior figures in charge of fostering green innovation) was identified. As the participants observed, such champions assimilated the usual role of bridging the gap between the top management and project teams by transforming sustainability policies into policies that will be implemented. The projects carried out by bureaucracy or strict hierarchies had difficulties in entrenching sustainability in the different departments. Managers in similar environments described decision-making as being siloed and compliance-based with little work between the technical, procurement, and environmental departments. This is a fact congruent with the results of Soares et al. (2024), who found the lack of the integration of sustainability in those organizations when the organizations did not manage to balance the departmental objectives and communication channels. The distribution of the resources was also critical towards the establishment of the sustainability outcomes. The interviewees revealed that organizations which had invested in sustainability training, research and technological tools enjoyed easy integration processes.

On the other hand, organizations that were constrained in terms of resources viewed sustainability as a further liability. Others highlighted that budgets of projects may not contain specific sustainability funds, and as such, teams have to do more with less. This is a typical problem common with Ofori (2023), who posited that insufficient funds and personnel are needed to carry out the implementation of sustainable sustainability in construction and infrastructure projects. Notably, the theme also made it known that organizational sustainability maturity is a product of progressive learning. Managers have explained the internal development of the symbolic gestures, like the adoption of environmental slogans, to the actual practices that include lifecycle analysis, waste tracking and stakeholder engagement. This slow process implies that integration of sustainability is a cultural and structural process, which demands management will, institutional reinforcements, and empowerment of employees.

Theme 3: Challenges and Tensions in Implementing Sustainability

Even with the increasing awareness, project managers continued to encounter a set of challenges still trying to ensure the implementation of sustainability amid time, budget, and performance expectations. A participant described: "Sustainability is the first concept that is at stake in the situation when the time or money is limited". Analysis was able to identify several barriers which are interrelated, such as economic pressures, limited technical knowledge, conflicting stakeholder interests and policy fragmentation. The most dominant constraint was economic pressure. The managers were regularly approached with clients whose interests lay in the minimisation of costs and immediate returns at the expense of sustainability in the long term. This contradiction is what Silvius (2024) described as the triple constraint paradox when the sustainability objectives are in conflict with time and budget necessities. Respondents described cases when they substituted the materials that were environmentally friendly with cheaper ones to achieve financial goals. These compromises watered down sustainability goals and supported the idea that green practices are costly as opposed to value-adding. The other significant barrier was knowledge gaps. Participants also said that they did not have the technical know-how to translate the sustainability policies into usable tools, though the majority of organizations had sustainability policies. One of the managers reported, "We are informed about applying the lifecycle assessment, but we are not taught how to do or analyse it". The observation is reminiscent of Ogunmakinde et al. (2022), in which standardised methodologies and insufficient professional training are emphasised to hinder the integration of sustainability in both developing and developed settings. There was also the theme of stakeholder conflict. Projects were a typical scenario where various actors who included

government agencies, contractors, consultants, and communities, were involved whose sustainability priorities varied. According to managers, this balancing of environmental, social and economic interests was termed as negotiating under pressure. In other situations, competing interests slowed down the process of project approvals or watered down sustainability commitments. This is in line with the view of Jariwala (2024), who pointed out that multi-stakeholder complexity in infrastructure development needs both adaptive leadership and participatory decision making in order to realise sustainable development. The policies were fragmented which made the implementation more challenging. Other interviewees also noted that local and national sustainability laws are not usually consistent and cause confusion during the implementation of the projects. One of the respondents responded: “We are following the green codes at the national level, but the local authorities have other standards”. Such contradictions are symptomatic of more severe governance problems since Orieno et al. (2024) explored that misalignment in policy had an adverse impact on the consistency and responsibility of sustainable infrastructure planning. Overall, this theme explains why it is apparent that the sustainability integration is an uncertain and controversial practice that is constrained by the institutional inertia, resources scarcity, and competing priorities. The problem between sustainability discourse and sustainability is sometimes a dilemma that the managers leap between the ideologies of environmental conservation and the actuality of operation.

Theme 4: Strategies for Aligning Sustainability with Project Performance

Project managers demonstrated that there is a diversity of adaptive responses in order to match sustainability goals and project performance targets and indicators. The key element of these strategies was the incorporation of sustainability in the initial planning and decision-making. The interviewees repeatedly stressed the essence of considering sustainability at the stage of design by stating that it is very challenging to make additions at the very end of the process, and any additions will be superficial. This aligns with Sandanayake et al. (2022), who discovered that a timely integration allows cost-effective and innovative sustainability solutions. Teamwork in planning was found to be an effective enabler. Managers said they used cross-functional teams that comprise engineers, environmentalists and community representatives in order to come up with sustainability priorities together. This participative strategy creates a sense of common ownership and minimises conflicts in the later stages of the project lifecycle. In addition, some of them used digital applications, including Building Information Modelling (BIM) and data analytics, to track environmental performance measures such as energy efficiency and waste minimisation. Technology uses increased transparency, which allows making decisions based on data analysis about sustainability. Capacity building was also one of the effective strategies. Others also conducted continuous sustainability training of project teams that equipped them with technical and managerial skills. One manager said, "When people realise the value that sustainability would provide, they will cease regarding it as extra work and own it". This observation can be echoed by Ferrarez et al. (2023), who reasoned that sustainability-focused learning facilitates culture change and lifelong enhancement. Advocacy of leadership was also emphasised by the participants. Sustainability champions encouraged project teams to stay green even when they were under pressure. Leadership devotion was used as a morality and operation anchor that justified sustainability in the organization. This suggests that compliance is not the only aspect of sustainability that is affected by leadership behaviour, as Eskerod and Huemann (2023) argue. Besides, the alignment of sustainability with financial performance was perceived as a compelling strategy to ease the resistance. Other managers were also using cost-benefit analyses to show how the sustainability policies (like the use of energy-saving systems or recycling of waste materials) saved money in the long run. This pragmatic presentation contributed to ensuring the buy-in of the stakeholders and strengthening the role of sustainability in relation to organizational goals.

Managers put focus on the constant assessment and education. The sustainability metrics were refined through post-project reviews and feedback loops, and best practices were shared across the projects. Such a reflective nature proves that the process of embedding sustainability is dynamic and is developed in the process of experimentation, feedback, and adaptation. The dynamic process is consistent with Ofori's (2023) statement that sustainability in project management is a type of organizational learning integrated into practice.

Table 2:
Thematic Analysis of Findings

Theme	Sub-theme	Codes	Description
Conceptualization and Meaning of Sustainability in Practice	Varied interpretations of sustainability	"Different for every project", "Depends on client vision", "Balancing ecology and cost"	Participants expressed diverse understandings of sustainability, often shaped by the project's scope, client expectations, and industry standards.
	Project-specific application	"Context-driven decisions", "Tailored sustainability goals", "Practical over ideal"	Managers adapted sustainability goals to fit specific project environments, focusing on realistic outcomes within resource constraints.
	Ethical and intergenerational awareness	"Doing right for the next generation", "Responsible construction", "Long-term community benefit"	Sustainability was framed not only as environmental stewardship but also as an ethical duty towards communities and future generations.
Organizational Culture and Structural Enablers	Leadership commitment	"Top management backing", "Leadership drives the agenda", "CEO champions sustainability"	The role of leadership was seen as central in embedding sustainability within organizational strategy and daily practice.
	Collaborative learning and knowledge sharing	"Cross-team workshops", "Peer learning", "Shared practices"	Collaboration fostered innovation and mutual understanding, promoting sustainable outcomes through shared expertise.
	Resource availability and training	"Limited budgets", "Insufficient training", "Capacity gaps"	Many organizations lacked adequate resources or professional development programs, limiting the consistent application of sustainable practices.
Challenges and Tensions in Implementation	Cost and time pressures	"Tight deadlines", "Cost overruns", "Sustainability is expensive"	Managers often faced constraints balancing sustainability with project

Theme	Sub-theme	Codes	Description
			cost and schedule requirements.
	Limited technical expertise	"Lack of tools", "Unclear methods", "No technical support"	A shortage of trained professionals and inadequate access to sustainability tools hampered implementation.
	Conflicting stakeholder interests	"Client wants cheapest option", "Disagreement on green standards", "Political influence"	Stakeholder misalignment created tension between environmental objectives and financial or political goals.
	Policy inconsistencies	"Confusing standards", "Contradictory regulations", "No unified framework"	Inconsistent or overlapping sustainability regulations hindered coherent decision-making and project compliance.
Strategies for Aligning Sustainability with Project Performance	Early-stage integration	"Plan sustainability from the start", "Embed in design", "Lifecycle focus"	Integrating sustainability in the early design stages ensured better alignment with project performance and risk mitigation.
	Technology-enabled monitoring	"Digital dashboards", "BIM for tracking", "Real-time reporting"	Digital tools were used to measure energy efficiency, waste reduction, and compliance during project execution.
	Capacity building and leadership advocacy	"Train the team", "Lead by example", "Mentorship programs"	Continuous learning and leadership advocacy strengthened the sustainability culture within organizations.
	Continuous evaluation and learning	"Post-project reviews", "Learning loops", "Feedback integration"	Managers emphasized iterative learning processes that refined sustainability outcomes across project lifecycles.

Summary of Findings

The results show that the process of implementing sustainability in the management of infrastructure projects is not a routine process, but a process dependent on the context with individual, organizational, and systemic factors. The project managers view sustainability as a multidimensional concept that involves environmental stewardship, economic efficiency and social responsibility. Nevertheless, they differ depending on organizational requirements, customer demands, and typologies of projects, making the operationalisation inconsistent in different cases. The culture within the organization became the key to the successful integration of sustainability. Those projects were put in supportive environments where leadership was characterised by a shared sustainability vision and supported staff to be innovative, achieving more

meaningful results. On the other hand, projects that were run in inflexible hierarchies or cultures based on cost saw sustainability as something that was added; it was not a principle incorporated. The availability of sustainability champions was crucial in the transformation of policy pledges into routine to support the idea that internal advocacy is the linkage between expectation and action. The research also established that economic strains and institutional disintegration are still the critical impediments. There was always tension between short-term financial targets and long-term sustainability promises, which managers had to make. Poor technical skills and incoherent policy frameworks exacerbated these difficulties, and the project teams had to compromise and weaken sustainability results in the process. However, this did not particularly endure with the thousands of managers who were resilient and used innovative practices like integration at an initial stage, cross-functional teamwork, digital monitoring, and cost-benefit justification to harmonise sustainability with project goals.

Practical Recommendations

Implementation of sustainability in the management of infrastructure projects demands structural, education and procedural change. Organizations are supposed to institutionalise sustainability by having elaborate systems which go beyond certification compliance (Sidhu & Gibbon, 2021). Integrating sustainability within organizational policies, performance standards, and acquisition policies makes it an obligatory principle and not a discretionary factor. Leadership is a critical aspect in building this change; hence, top management needs to always support sustainability and invest specific budgets in this change (Boeske, 2023). The project managers need continuous professional growth so as to enhance their technical skills in tools like lifecycle assessment, carbon auditing and sustainability reporting. Team-based training efforts are aimed at teaming organizations with both analytical and teamwork skills to be able to create a culture of responsibility and innovation (Sten et al., 2023). Multidisciplinary teams and open communication channels should be promoted to eliminate the amount of isolation of sustainability functions in order to ensure cross-departmental collaboration. It is also essential to integrate technology. Companies must invest in digital platforms, including Building Information modelling (BIM) and a sustainability dashboard, where they can monitor energy consumption, waste and emissions in real-time (Li et al., 2025). These applications promote transparency and data-driven decision-making and less dependence on judgment. Moreover, the correlation of sustainability with economic performance in terms of cost-benefit analysis and valuation of long-term assets will enhance its strategic legitimacy to the stakeholders (Čavlin et al., 2024). On a policy level, national and local requirements and regulatory ambiguity should be eradicated through increased compatibility between national and local sustainability guidelines. The state agencies and the industry associations ought to join hands in developing a standardised sustainability benchmark that will be used to steer the development of infrastructure (Mehraban et al., 2025). Lastly, a community-focused approach and stakeholder involvement at the initial phase of project development may promote social inclusiveness and make sustainability practices more attuned to local practices and values.

Future Research Directions

Although this study provides essential information on managerial experiences of sustainability integration, it also has an integration; should be further explored. The study should be extended to other stakeholders other than project managers in future studies to take into account the views of clients, policy makers and community members in order to provide a more comprehensive view of the sustainability governance in infrastructural projects. The relative study of an industry and geographical context can also be used to provide further insight into the role of cultural and institutional dissimilarity in promoting sustainability. Such findings can be complemented by the

quantitative research which will quantify the relationship between sustainability maturity and the project performance indicators such as the cost efficiency, stakeholder satisfaction, and reduction of environmental impact. This would also be complemented by the longitudinal studies that would assist in the process of follow-up on the process of sustainability integration within multiple project cycles, along with the long-term implications on the organizational learning.

The new technology is also abundant to explore such as artificial intelligence, digital twins, and blockchain (Suhail et al., 2022). The next study should be dedicated to the ways in which these innovations can support the sustainability checks and enhance the transparency and help to make predictive decisions. Lastly, the theoretical discussion of the overlap between ethical leadership, systems thinking, and sustainability would help us learn more about the role of human values in the definition of sustainable project management practices.

Conclusion

The inclusion of the concept of sustainability into project management practice in infrastructure projects is a revolutionary but difficult direction in modern-day management. This study showed that sustainability is not an outer objective, but a process that is dynamic and forms part and parcel of decision making, organizational culture, and stakeholder partnership. The experiences of project managers who live demonstrated that although sustainability awareness has increased substantially, it is only inconsistently translated into systematic practice because of contextual pressures, technical constraints, and unclear policies. The study identified four themes that are interrelated to define sustainability integration. To start with, sustainability is understood differently depending on the size of the project, the priorities given by the client, and the geographical location, which implies that there is no single definition of sustainability operations. Second, leadership commitment and organizational culture were identified as critical enablers. Sustainability was installed in project delivery processes where top management advocacy, collaborative learning and training existed. Third, the systemic issues like cost limitations, shortage of skills, and contradictory interests of stakeholders still remain as impediments to meaningful implementation. Lastly, the concept of strategic alignment between sustainability and performance objectives, which was achieved by implementing an early-stage integration, the use of technologies, and continuous learning, has become a crucial factor of long-term success. This analysis shows that sustainability in the management of infrastructure projects is a socio-technical construct that is influenced by human values, institutional structures and changing technological opportunities. Integration cannot just happen by complying with the environmental standards, but rather by a cultural change towards responsible government and transformational leadership.

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