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**Research Article**

# Driving Sustainable Project Success Through Sustainable Project Management: Unveiling the Roles of Stakeholder Engagement and Organizational Culture

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**Conflict of Interest**
The authors declare that they have no conflict of interest.

**Abstract**

Sustainable project management has become essential for delivering long-term economic, environmental, and social value. However, limited evidence explains how sustainable project management translates into sustainable project success, particularly in emerging economies. Drawing on stakeholder theory and contingency theory, this study examines the direct effect of sustainable project management on sustainable project success, the mediating role of stakeholder engagement, and the moderating role of organizational culture in Pakistan's construction industry. Data were collected from 350 construction professionals using a structured questionnaire and analyzed using Hayes' PROCESS Macro. The results show that sustainable project management significantly enhances sustainable project success, both directly and indirectly through stakeholder engagement, confirming stakeholder engagement as a key explanatory mechanism. However, organizational culture does not significantly moderate either the relationship between sustainable project management and stakeholder engagement or the indirect relationship between sustainable project management and sustainable project success. This study contributes to the sustainable project management literature by integrating stakeholder theory and contingency theory into a unified framework and providing evidence from an emerging economy. The findings offer practical guidance for strengthening sustainable project outcomes through sustainability-oriented management practices and effective stakeholder engagement.

**Keywords:** Sustainable project management; Sustainable project success; Stakeholder engagement; Organizational culture; Construction industry; Pakistan.

**How to Cite this Work:**

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## 1 INTRODUCTION

The growing challenges of climate change, environmental degradation, resource scarcity, and rising societal expectations have fundamentally transformed how organizations define and evaluate project success (Shamas et al., 2025). Traditionally, project success was assessed using the "iron triangle" of cost, time, and quality. However, increasing emphasis on sustainable development has broadened this perspective, requiring projects to create long-term economic, environmental, and social value while meeting the expectations of diverse stakeholders (Martens & Carvalho, 2017; Silvius, 2017). Consequently, organizations are increasingly embedding sustainability principles into project management practices to improve organizational performance while contributing to broader sustainability objectives (Carvalho & Rabechini Jr., 2017; Aarseth et al., 2017). The construction industry is particularly important in advancing sustainable development because of its significant environmental, economic, and social impacts (Majeed et al., 2026). As one of the largest consumers of natural resources and contributors to greenhouse gas emissions, the sector plays a critical role in achieving global sustainability goals while simultaneously supporting infrastructure development, employment, and economic growth (United Nations Environment Programme [UNEP], 2024; Buhl & Markolf, 2023). Consequently, governments, clients, and project-based organizations increasingly expect project managers to integrate environmental stewardship, social responsibility, and economic viability throughout the project life cycle (Aarseth et al., 2017; Kivilä et al., 2017). This shift has accelerated the adoption of sustainable project management (SPM), which extends conventional project management by incorporating environmental, social, economic, and governance considerations into project planning, implementation, monitoring, and evaluation (Silvius, 2017; Carvalho & Rabechini Jr., 2017).

Alongside this evolution, the concept of SPS has expanded beyond traditional performance indicators. Rather than focusing solely on efficiency-related outcomes, SPS encompasses stakeholder satisfaction, environmental protection, social responsibility, organizational resilience, and long-term value creation (Martens & Carvalho, 2017). Although previous studies generally report a positive relationship between SPM and project performance, systematic reviews indicate that the mechanisms through which sustainability-oriented management practices generate sustainable project outcomes remain insufficiently understood (Liaqat et al., 2024; Wu et al., 2023; Afari et al., 2025). This suggests that examining only direct relationships provides an incomplete understanding of how sustainability practices influence project success. Among the factors that may explain this relationship, stakeholder engagement (SE) has received growing scholarly attention (Shamas et al., 2025). According to Stakeholder Theory, organizations achieve superior outcomes by effectively managing relationships with stakeholders who provide essential resources, legitimacy, knowledge, and support (Freeman et al., 2010). In project environments, effective stakeholder engagement strengthens communication, collaboration, trust, transparency, and participatory decision-making, thereby improving project implementation and increasing the likelihood of achieving SPS (Aaltonen & Kujala, 2016; Yang et al., 2011; Zheng et al., 2019; Wu et al., 2023). Therefore, stakeholder engagement represents a plausible behavioural mechanism through which SPM contributes to SPS.

The effectiveness of sustainability initiatives may also depend on organizational context. Contingency Theory argues that management practices produce different outcomes depending on organizational and environmental conditions (Donaldson, 2001). Among these contextual factors, organizational culture (OC) has been widely recognized as an important determinant of organizational learning, collaboration, innovation, and responsiveness to stakeholder expectations (Hartnell et al., 2011; Linnenluecke & Griffiths, 2010). Organizations with sustainability-oriented cultures are generally better positioned to implement sustainability practices effectively and enhance project performance (Zhang et al., 2023). Nevertheless, empirical evidence regarding the moderating role of organizational culture in SPM remains limited. Despite the growing literature on SPM, three important research gaps remain. First, previous studies have largely emphasized direct relationships between SPM and project outcomes while paying limited attention to the behavioural mechanisms that explain how sustainability-oriented practices enhance project success, particularly through stakeholder engagement (Blak Bernat et al., 2023; Afari et al., 2025). Second, relatively few studies have integrated Stakeholder Theory and Contingency Theory within a single framework to explain both the mediating and contextual processes underlying SPS (Afari et al., 2025). Third, existing evidence is concentrated primarily in developed economies, limiting the generalizability of findings to emerging economies where institutional environments, stakeholder expectations, and sustainability challenges differ substantially (Kiani Mavi et al., 2021; Afari et al., 2025; Isang et al., 2025). Addressing these gaps is particularly important in Pakistan's construction industry, where sustainability practices are becoming increasingly significant but empirical evidence remains scarce.

Accordingly, this study investigates the relationship between SPM and SPS by examining the mediating role of stakeholder engagement and the moderating role of organizational culture in Pakistan's construction industry. Drawing upon Stakeholder Theory and Contingency Theory, the study develops and empirically tests an integrated framework explaining both the behavioural mechanism and contextual conditions through which SPM contributes to SPS. The study makes three contributions. First, it extends Stakeholder Theory by identifying stakeholder engagement as a key mechanism linking SPM to SPS. Second, it enriches Contingency Theory by examining the contextual influence of organizational culture on sustainability-oriented management practices. Third, it provides empirical evidence from an underexplored emerging economy, responding to recent calls for greater contextual diversity and strengthening the external validity of SPM research (Afari et al., 2025; Isang et al., 2025). The remainder of this paper reviews the relevant literature and develops the hypotheses, describes the research methodology, presents the empirical findings, discusses the theoretical and practical implications, and concludes with the study's limitations and future research directions.

## 2 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### 2.1 Theoretical Foundation

This study is grounded in Stakeholder Theory and Contingency Theory, which together provide a comprehensive theoretical foundation for explaining how SPM contributes to SPS. While Stakeholder Theory explains the behavioural mechanism through which sustainability-oriented practices improve project outcomes, Contingency Theory provides insight into the organizational conditions under which these relationships are strengthened or weakened. Stakeholder Theory, by Freeman et al. (2010), argues that organizational success depends on effectively managing relationships with stakeholders who influence or are influenced by organizational activities. Within project environments, stakeholders contribute essential resources, knowledge, legitimacy, and support that are critical for successful project implementation (Freeman et al., 2010; Aaltonen & Kujala, 2016). Rather than viewing stakeholders merely as external actors, the theory emphasizes their active participation throughout the project life cycle. In sustainability-oriented projects, effective stakeholder engagement enhances communication, trust, collaboration, and transparency, thereby facilitating the successful implementation of sustainability initiatives and improving long-term project outcomes (Yang et al., 2011; Wu et al., 2023). While Stakeholder Theory explains how sustainable management practices influence project outcomes, Contingency Theory explains when these practices are most effective. Contingency Theory argues that no single management approach is universally applicable because organizational effectiveness depends on contextual conditions (Donaldson, 2001). One of the most influential contextual factors in sustainability research is organizational culture, which shapes organizational values, collaboration, innovation, learning, and responsiveness to stakeholder expectations (Linnenluecke & Griffiths, 2010). Organizations characterized by supportive and sustainability-oriented cultures are generally more capable of implementing sustainability initiatives successfully and adapting to changing stakeholder and environmental demands (Hartnell et al., 2011; Zhang et al., 2023). Integrating these two theories provides a robust explanation of sustainable project performance. Stakeholder Theory explains the mediating role of stakeholder engagement between SPM and SPS, whereas Contingency Theory suggests that organizational culture may influence the effectiveness of this relationship. Accordingly, the integrated theoretical framework provides a comprehensive perspective for understanding both the behavioural mechanism and contextual conditions through which SPM contributes to SPS.

### 2.2 Sustainable Project Management and Sustainable Project Success

SPM extends conventional project management by integrating environmental, social, economic, and governance considerations throughout the project life cycle (Silvius & Schipper, 2014). Unlike traditional approaches that primarily emphasize cost, time, and quality, SPM focuses on long-term value creation, responsible resource utilization, stakeholder inclusiveness, ethical governance, and environmental stewardship (Carvalho & Rabechini Jr., 2017; Silvius, 2017). Consequently, sustainability principles are embedded into project planning, execution, monitoring, and evaluation to enhance both organizational performance and broader sustainable development objectives. Similarly, SPS has evolved beyond conventional performance indicators (Shamas et al., 2025). Contemporary perspectives recognize that successful projects should not only achieve operational efficiency but also generate environmental, social, and economic benefits while satisfying stakeholder expectations and creating lasting organizational value (Martens & Carvalho, 2017). Projects managed according to sustainability principles are more likely to improve resource efficiency, reduce environmental impacts, strengthen stakeholder confidence, and enhance long-term organizational competitiveness. A growing body of empirical evidence supports the positive relationship between SPM and project

success. Previous studies have consistently reported that sustainability-oriented project management practices improve project performance by enhancing operational efficiency, organizational resilience, stakeholder satisfaction, and long-term value creation (Kivilä et al., 2017; Blak Bernat et al., 2023; Liaqat et al., 2024; Wu et al., 2023). Recent review studies further conclude that organizations integrating sustainability principles into project management are better positioned to achieve superior project outcomes while responding effectively to environmental and societal challenges (Afari et al., 2025). Therefore, the following hypothesis is proposed:

*H1: Sustainable project management positively influences sustainable project success.*

### 2.3 Sustainable Project Management and Stakeholder Engagement

Stakeholder engagement refers to the continuous process of involving stakeholders in communication, consultation, collaboration, and decision-making throughout the project life cycle (Yang et al., 2011). Sustainability-oriented projects typically involve multiple stakeholder groups with diverse expectations and interests, making effective stakeholder engagement essential for project implementation and long-term success (Shamas et al., 2025). From the perspective of Stakeholder Theory, organizations adopting SPM practices actively promote transparency, inclusiveness, and collaborative governance, thereby encouraging meaningful stakeholder participation (Freeman et al., 2010). Sustainability-oriented management practices establish effective communication channels, improve stakeholder trust, facilitate knowledge sharing, and strengthen collaborative relationships among project participants (Aaltonen & Kujala, 2016). These practices enhance project legitimacy while reducing conflicts and improving decision quality throughout project implementation. Empirical studies consistently demonstrate that SPM strengthens stakeholder integration by promoting communication, collaboration, transparency, and mutual trust among project stakeholders (Yang et al., 2011; Blak Bernat et al., 2023; Wu et al., 2023). More recently, Isang et al. (2025) reported that effective stakeholder engagement plays a central role in advancing sustainability initiatives within construction projects by improving cooperation, stakeholder commitment, and project effectiveness. Consequently, organizations implementing sustainability-oriented project management practices are expected to achieve higher levels of stakeholder engagement.

*H2: Sustainable project management positively influences stakeholder engagement.*

### 2.4 Stakeholder Engagement and Sustainable Project Success

Stakeholder engagement has been widely recognized as a fundamental determinant of project success, particularly in projects characterized by high complexity and sustainability requirements. According to Stakeholder Theory, stakeholders provide essential resources, knowledge, legitimacy, and support that facilitate project implementation and enhance organizational performance (Freeman et al., 2010). Effective engagement encourages continuous communication, collaborative problem-solving, and shared decision-making, enabling project teams to better understand stakeholder expectations while reducing conflicts and implementation risks. In sustainability-oriented projects, stakeholder engagement assumes even greater importance because project outcomes extend beyond traditional performance objectives to encompass environmental stewardship, social responsibility, and long-term value creation. Active stakeholder participation improves transparency, strengthens trust, enhances knowledge exchange, and promotes cooperation among project participants, thereby increasing the likelihood of achieving sustainable project outcomes (Aaltonen & Kujala, 2016; Yang et al., 2011). Engaged stakeholders are also more likely to support project implementation, facilitate resource mobilization, and contribute innovative solutions to sustainability-related challenges. Previous empirical studies consistently demonstrate that stakeholder engagement positively influences project performance and sustainability outcomes. Projects characterized by strong stakeholder collaboration report higher stakeholder satisfaction, improved decision quality, enhanced project legitimacy, and superior long-term performance (Yang et al., 2011; Wu et al., 2023). Recent studies further suggest that stakeholder engagement strengthens organizational resilience and improves the successful implementation of sustainability initiatives by fostering trust, accountability, and collaborative governance (Isang et al., 2025). Therefore, organizations that actively engage stakeholders throughout the project life cycle are more likely to achieve SPS.

*H3: Stakeholder engagement positively influences sustainable project success.*

### 2.5 Mediating Role of Stakeholder Engagement

Stakeholder Theory suggests that sustainability-oriented management practices create value primarily by strengthening relationships between organizations and their stakeholders (Freeman et al., 2010). Rather than influencing project success directly, SPM establishes governance mechanisms, communication channels, and participatory decision-making processes that encourage stakeholder involvement throughout the project life cycle. Through these practices,

organizations develop stronger stakeholder trust, improve transparency, and facilitate collaboration, ultimately enhancing project implementation and long-term sustainability outcomes (Freeman et al., 2010; Aaltonen & Kujala, 2016). Recent research indicates that stakeholder engagement represents an important behavioural mechanism through which sustainability initiatives improve organizational and project performance. Sustainability-oriented management practices encourage greater stakeholder participation, knowledge sharing, and collaborative problem-solving, enabling organizations to respond more effectively to stakeholder expectations while improving project legitimacy and implementation effectiveness (Blak Bernat et al., 2023; Wu et al., 2023). These collaborative processes reduce implementation barriers, improve stakeholder commitment, and facilitate the successful realization of sustainability objectives. Although the direct relationship between SPM and project success has received considerable scholarly attention, relatively few studies have explicitly examined stakeholder engagement as the mechanism through which sustainability-oriented management practices generate sustainable project outcomes, particularly within construction projects in emerging economies (Liaqat et al., 2024; Afari et al., 2025). Examining this mediating relationship therefore provides a more comprehensive understanding of how sustainability practices influence project success beyond simple direct effects. Accordingly, stakeholder engagement is expected to mediate the relationship between SPM and SPS.

*H4: Stakeholder engagement mediates the relationship between sustainable project management and sustainable project success.*

### 2.6 Moderating Role of Organizational Culture

Organizational culture reflects the shared values, beliefs, and norms that shape employee behaviour, organizational learning, and decision-making processes (Schein, 2010). From the perspective of Contingency Theory, the effectiveness of management practices depends on the organizational context in which they are implemented rather than on universal management principles (Donaldson, 2001). Consequently, organizations with different cultural environments may experience different outcomes from adopting identical sustainability practices. Organizations characterized by collaborative, innovative, and sustainability-oriented cultures generally encourage learning, knowledge sharing, employee participation, and responsiveness to stakeholder expectations, thereby creating favourable conditions for implementing sustainability initiatives (Hartnell et al., 2011; Linnenluecke & Griffiths, 2010). Such organizations are more capable of integrating sustainability into project management processes while strengthening collaboration among project participants (Majeed et al., 2026). In contrast, organizations with rigid structures, limited collaboration, and resistance to change may experience greater difficulty in translating sustainability initiatives into effective stakeholder engagement and project outcomes. Recent empirical evidence suggests that supportive organizational cultures strengthen sustainability-oriented behaviours, enhance innovation capability, and improve organizational responsiveness to environmental and stakeholder demands (Amir et al., 2024; Zhang et al., 2023). Therefore, organizational culture is expected to reinforce the positive influence of SPM on stakeholder engagement by creating an environment that supports collaboration, communication, and sustainability-oriented decision-making.

*H5: Organizational culture positively moderates the relationship between sustainable project management and stakeholder engagement such that the relationship is stronger when organizational culture is more supportive of sustainability.*

### 2.7 Moderated Mediation Effect of Organizational Culture

While stakeholder engagement explains the behavioural mechanism through which SPM contributes to SPS, Contingency Theory suggests that the strength of this indirect relationship may depend on the organizational context. Specifically, organizations differ in their ability to implement sustainability-oriented practices because management effectiveness is contingent upon contextual conditions rather than universal principles (Donaldson, 2001). Consequently, the indirect influence of SPM on SPS through stakeholder engagement may vary according to the prevailing organizational culture (Majeed et al., 2026). Organizations characterized by supportive and sustainability-oriented cultures encourage collaboration, innovation, organizational learning, and openness to stakeholder participation (Hartnell et al., 2011; Linnenluecke & Griffiths, 2010). Such cultures facilitate the implementation of sustainability initiatives by strengthening communication, promoting knowledge sharing, and enhancing employees' willingness to engage with both internal and external stakeholders. As a result, sustainability-oriented project management practices are expected to generate stronger stakeholder engagement, thereby improving sustainable project outcomes. Conversely, organizations with less supportive cultures may encounter greater resistance to sustainability initiatives, reducing the effectiveness of stakeholder engagement and limiting the benefits of SPM. Recent sustainability research increasingly emphasizes that organizational context plays an important role in determining the effectiveness of sustainability-oriented

management practices. Organizations that foster collaborative and innovation-oriented cultures are generally more successful in embedding sustainability principles into organizational processes and translating these practices into improved project performance (Zhang et al., 2023; Amir et al., 2024). Nevertheless, empirical evidence examining the conditional indirect effect of organizational culture within SPM remains limited, particularly in construction projects and emerging economies (Afari et al., 2025). Examining this moderated mediation relationship therefore provides a more comprehensive understanding of both the mechanism and contextual conditions through which SPM contributes to SPS. Building upon Stakeholder Theory and Contingency Theory, this study proposes that the indirect effect of SPM on SPS through stakeholder engagement becomes stronger when organizational culture is more supportive of sustainability. Accordingly, the following hypothesis is proposed:

*H6: Organizational culture positively moderates the indirect relationship between sustainable project management and sustainable project success through stakeholder engagement such that the indirect effect is stronger under higher levels of organizational culture.*

Figure 1 presents the conceptual framework of the study, illustrating the hypothesized relationships among SPM, stakeholder engagement, organizational culture, and SPS.

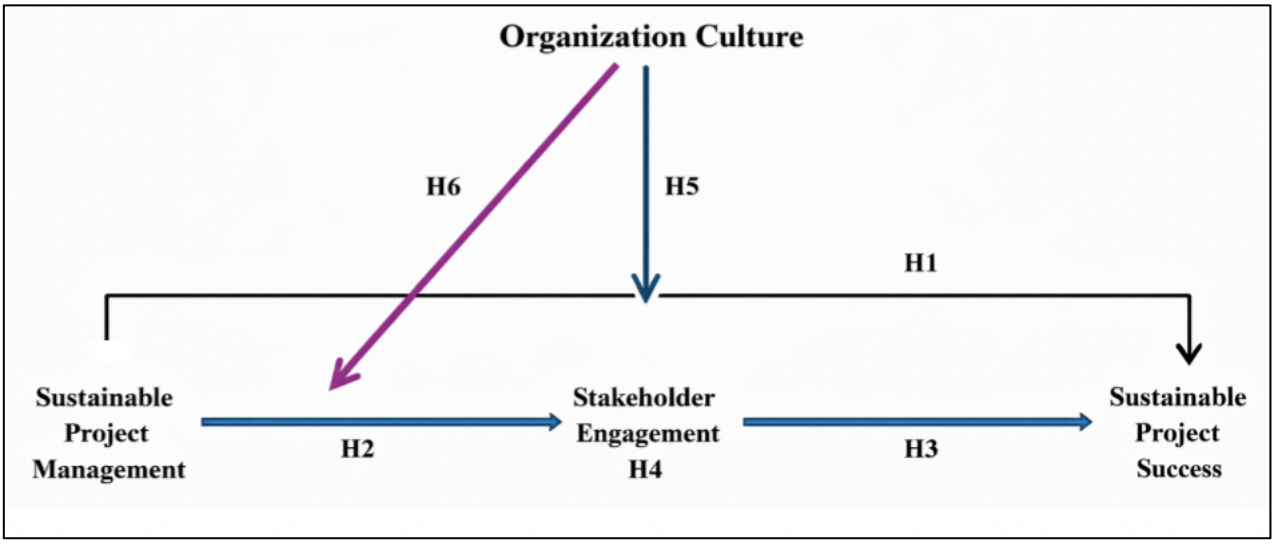


**Figure 1.** Conceptual framework of the study

**Source:** Authors' conceptualization

## 3 RESEARCH METHODOLOGY

### 3.1 Research Design and Sample

A survey-based approach was considered appropriate because the study aimed to empirically test the proposed conceptual framework and hypotheses using statistical techniques (Hair et al., 2022). The research was conducted in Pakistan's construction and infrastructure sector, which was selected due to its significant environmental, economic, and social implications and its growing emphasis on SPM (Kivilä et al., 2017). The target population comprised project professionals, including project managers, project directors, planning engineers, site engineers, consultants, project coordinators, and senior project personnel directly involved in project planning, execution, and monitoring. Because no comprehensive sampling frame was available, purposive sampling was employed to recruit respondents with relevant project management experience (Saunders et al., 2019). Data were collected through professional networks, construction organizations, and online platforms over a three-month period. Of the 400 distributed questionnaires, 350 valid responses were retained after excluding incomplete questionnaires, resulting in an effective response rate of 87.5%. The final sample exceeded the minimum recommendations for mediation and moderated mediation analyses, ensuring adequate statistical power (Hair et al., 2022).

### 3.2 Measurement of Variables

All constructs were measured using previously validated instruments adapted from established studies. Responses were recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). SPM was measured

using sixteen items adapted from Liaqat et al. (2024), capturing sustainability-oriented project management practices across environmental, social, economic, and governance dimensions. SE was assessed using seven items adapted from Mohamed (2021), reflecting stakeholder participation, communication, consultation, transparency, and collaborative decision-making. OC was measured using nine items adapted from Zheng et al. (2019), representing collaboration, innovation, organizational learning, adaptability, and sustainability-supportive values. SPS was measured using fifteen items adapted from Martens and Carvalho (2017), encompassing economic, environmental, social, stakeholder, and long-term value dimensions. Minor contextual modifications were made to ensure consistency with Pakistan's construction industry while preserving the original conceptual meaning of each scale.

### 3.3 Data Analysis

Data were analyzed using IBM SPSS Statistics and Hayes' PROCESS Macro Version 5.0 (Hayes, 2022). The analytical procedure consisted of four stages. First, descriptive statistics and Pearson correlation analyses were performed to examine respondent characteristics and associations among the study variables. Second, PROCESS Model 4 was employed to test the mediating effect of SE. Third, PROCESS Model 1 was used to examine the moderating effect of OC on the relationship between SPM and SE. Finally, PROCESS Model 7 was applied to assess the proposed moderated mediation model. All indirect and conditional effects were estimated using 5,000 bootstrap resamples with bias-corrected 95% confidence intervals. Effects were considered statistically significant when the confidence intervals excluded zero (Hayes, 2022).

### 3.4 Common Method Bias and Ethical Considerations

Several procedural remedies were implemented during questionnaire design and administration to minimize common method bias, including assuring respondent anonymity, maintaining confidentiality, and improving the psychological separation of predictor and criterion variables (Podsakoff et al., 2012). Harman's single factor tests further indicated that the first factor accounted for less than 50% of the total variance, suggesting that common method bias was unlikely to threaten the validity of the findings. The study complied with established ethical standards for social science research. Participation was voluntary, informed consent was obtained from all respondents, and anonymity and confidentiality were strictly maintained throughout the research process. No personally identifiable information was collected, and all responses were analysed in aggregate form exclusively for academic purposes.

## 4 EMPIRICAL ANALYSIS

### 4.1 Respondent Profile

A total of 350 valid responses from construction professionals in Pakistan were retained for analysis. As shown in Table 1, the respondents represented diverse project roles, including foremen (27.4%), project managers (26.9%), engineers (24.6%), and sub-engineers (21.1%). Approximately 79.1% of the respondents possessed more than five years of professional experience, indicating substantial practical exposure to construction and infrastructure projects. Regarding educational qualifications, 44.0% held diplomas, followed by master's degrees (24.6%), bachelor's degrees (19.7%), and doctoral degrees (11.7%). Male respondents represented 80.6% of the sample, while the largest age group was between 31 and 40 years (32.0%). Overall, the sample adequately represents experienced professionals involved in construction projects across Pakistan and is considered appropriate for examining the proposed research model.

### 4.2 Measurement Model Assessment

Prior to hypothesis testing, the reliability and validity of the measurement model were assessed. Table 2 reports the descriptive statistics, internal consistency reliability, convergent validity, discriminant validity, and correlation coefficients for all study constructs. The mean values ranged from 2.982 to 3.086, indicating moderate perceptions across the four constructs. Standard deviations ranged between 0.702 and 0.804, reflecting acceptable variability in respondents' perceptions. Cronbach's alpha values ranged from 0.816 to 0.903, while composite reliability values ranged from 0.852 to 0.914, exceeding the recommended threshold of 0.70 and confirming satisfactory internal consistency (Nunnally & Bernstein, 1994). Likewise, average variance extracted values exceeded 0.50 for all constructs, establishing convergent validity (Fornell & Larcker, 1981). Discriminant validity was confirmed because the square root of the average variance extracted for each construct exceeded the corresponding inter-construct correlations. Pearson correlation analysis further revealed positive and statistically significant relationships among all constructs ($p < .01$), with correlation coefficients ranging from 0.214 to 0.498. None of the correlation coefficients exceeded the

recommended threshold of 0.70, indicating that multicollinearity was unlikely to influence the subsequent analyses. This conclusion was further supported by variance inflation factor values ranging from 1.09 to 1.25, which were well below the recommended cut-off values.

**Table 1.** Respondent profile

| Characteristic | Category | n | % |
|---|---|---|---|
| Role | Foreman | 96 | 27.4 |
| | Project Manager | 94 | 26.9 |
| | Engineer | 86 | 24.6 |
| | Sub Engineer | 74 | 21.1 |
| Experience | <5 years | 73 | 20.9 |
| | 5–10 years | 95 | 27.1 |
| | 11–15 years | 79 | 22.6 |
| | >15 years | 103 | 29.4 |
| Education | Diploma | 154 | 44.0 |
| | Bachelor's | 69 | 19.7 |
| | Master's | 86 | 24.6 |
| | PhD | 41 | 11.7 |
| Gender | Male | 282 | 80.6 |
| | Female | 68 | 19.4 |
| Age | <25 years | 53 | 15.1 |
| | 25–30 years | 54 | 15.4 |
| | 31–40 years | 112 | 32.0 |
| | 41–50 years | 76 | 21.7 |
| | >50 years | 55 | 15.7 |

***Note.*** *Values represent frequency and percentage.* ***Source:*** *Authors' calculations based on survey data.*

**Table 2.** Descriptive statistics, reliability, validity, and correlations

| Variable | Mean | SD | α | CR | AVE | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|
| 1. SPM | 2.982 | 0.741 | 0.887 | 0.904 | 0.562 | 0.750 | | | |
| 2. SE | 3.018 | 0.768 | 0.842 | 0.873 | 0.524 | 0.412** | 0.724 | | |
| 3. OC | 2.991 | 0.702 | 0.816 | 0.852 | 0.501 | 0.296** | 0.214** | 0.708 | |
| 4. SPS | 3.086 | 0.804 | 0.903 | 0.914 | 0.583 | 0.451** | 0.498** | 0.337** | 0.764 |

***Note.*** *α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted; diagonal values represent the square root of AVE. **p < .01.* ***Source:*** *Authors' calculations based on survey data.*

### 4.3 Structural Model Assessment

The proposed hypotheses were examined using Hayes' PROCESS Macro Version 5.0 with 5,000 bootstrap resamples. Prior to estimating the structural relationships, diagnostic statistics confirmed that multicollinearity was not a concern, as variance inflation factor values ranged from 1.09 to 1.25, which are well below the recommended threshold (Hair et al., 2022). Accordingly, the structural model was considered appropriate for hypothesis testing. The results indicate that SPM had a significant positive effect on SPS ($\beta = 0.243$, $p < .001$), providing support for H1. Similarly, SPM significantly enhanced SE ($B = 0.402$, $p < .001$), supporting H2. Furthermore, SE exerted a significant positive influence on SPS ($\beta = 0.268$, $p < .001$), thereby supporting H3. Collectively, these findings provide evidence that sustainability-oriented project management practices contribute directly to SPS while simultaneously strengthening stakeholder engagement.

The mediating role of SE was assessed using PROCESS Model 4. The indirect effect of SPM on SPS through SE was positive and statistically significant (Indirect Effect = 0.121, 95% Bootstrap CI = [0.072, 0.179]). Because the confidence interval excluded zero, SE partially mediated the relationship between SPM and SPS, supporting H4. This finding suggests that sustainability-oriented project management enhances project success not only through its direct influence but also by improving stakeholder participation, communication, and collaboration throughout the project lifecycle. The moderating role of OC was subsequently examined using PROCESS Model 1. The interaction effect between SPM and OC was not statistically significant (Interaction Effect = 0.031, $p = .252$), indicating that OC did not

significantly strengthen or weaken the relationship between SPM and SE. Therefore, H5 was not supported. Finally, PROCESS Model 7 was employed to assess the proposed moderated mediation effect. The index of moderated mediation was 0.009, with a 95% bootstrap confidence interval ranging from −0.006 to 0.024. Since the confidence interval included zero, the conditional indirect effect was not statistically significant. These findings indicate that the mediating role of SE remained stable across different levels of OC, providing no empirical support for H6. Overall, the findings demonstrate that stakeholder engagement represents the primary behavioural mechanism through which SPM contributes to SPS, whereas organizational culture does not significantly condition this indirect relationship.

**Table 3.** Structural Model Assessment

| Hypothesis | Proposed relationship | Statistical result | Decision |
|---|---|---|---|
| H1 | SPM positively influences SPS | $\beta = 0.243$, $p < .001$ | Supported |
| H2 | SPM positively influences SE | $B = 0.402$, $p < .001$ | Supported |
| H3 | SE positively influences SPS | $\beta = 0.268$, $p < .001$ | Supported |
| H4 | SE mediates the relationship between SPM and SPS | Indirect Effect = 0.121, 95% Bootstrap CI [0.072, 0.179] | Supported |
| H5 | OC moderates the relationship between SPM and SE | Interaction Effect = 0.031, $p = .252$ | Not Supported |
| H6 | OC moderates the indirect relationship between SPM and SPS through SE | Index of Moderated Mediation = 0.009, 95% Bootstrap CI [−0.006, 0.024] | Not Supported |

***Note.*** *Direct, mediation, moderation, and moderated mediation effects were estimated using Hayes' PROCESS Macro Version 5.0 with 5,000 bootstrap resamples. Bootstrap effects were considered statistically significant when the 95% confidence interval did not include zero.* ***Source:*** *Authors' calculations using IBM SPSS Statistics and Hayes' PROCESS Macro Version 5.0.*

## 5 DISCUSSION

The findings demonstrate that SPM contributes to SPS both directly and indirectly through SE, whereas OC does not significantly influence the proposed mediation mechanism. These findings provide new empirical evidence regarding the behavioural processes through which sustainability-oriented project management enhances project performance in an emerging economy (Shamas et al., 2025). The results support H1 by confirming that SPM has a significant positive effect on SPS. This finding suggests that organizations integrating environmental, social, economic, and governance considerations throughout the project lifecycle are more likely to achieve sustainable project outcomes than those relying solely on traditional project management practices (Piwowar-Sulej & Iqbal, 2025). Sustainability-oriented management practices improve resource utilization, strengthen stakeholder confidence, reduce environmental impacts, and enhance long-term project value, thereby contributing to overall project success. This finding is consistent with previous studies reporting that sustainability integration improves both project performance and organizational resilience (Martens & Carvalho, 2017; Kivilä et al., 2017; Blak Bernat et al., 2023; Liaqat et al., 2024).

The results also provide support for H2 by demonstrating that SPM significantly enhances SE. This finding is consistent with Stakeholder Theory, which argues that organizations achieve superior outcomes by effectively managing relationships with stakeholders who provide essential knowledge, legitimacy, and support (Freeman, 1984; Freeman et al., 2010). Sustainability-oriented project management encourages transparent communication, collaborative decision-making, and inclusive governance, thereby strengthening stakeholder participation throughout the project lifecycle. These findings corroborate previous studies showing that sustainability practices improve stakeholder collaboration, trust, and project legitimacy (Aaltonen & Kujala, 2016; Yang et al., 2011; Wu et al., 2023). Consistent with H3, SE exhibited a significant positive relationship with SPS. Engaged stakeholders contribute valuable resources, expertise, and institutional support that facilitate project implementation while reducing conflicts and improving decision quality. Active stakeholder participation also promotes transparency, accountability, and mutual trust, all of which contribute to the successful delivery of sustainable projects (Shamas et al., 2025). This finding supports previous empirical evidence suggesting that effective stakeholder engagement represents one of the most important determinants of sustainable project performance (Yang et al., 2011; Mohamed, 2021; Isang et al., 2025).

The mediation analysis further supports H4 by demonstrating that SE partially mediates the relationship between SPM and SPS. This finding represents one of the principal contributions of the study because it explains *how* sustainability-oriented project management translates into SPS. Rather than influencing project outcomes solely through direct managerial practices, SPM improves project performance by strengthening stakeholder communication,

collaboration, and participation (Piwowar-Sulej & Iqbal, 2025). Consequently, stakeholder engagement represents an important behavioural mechanism linking sustainability practices with long-term project success. This finding extends Stakeholder Theory by providing empirical evidence that stakeholder engagement functions as a critical pathway through which sustainability initiatives generate organizational and project value (Majeed et al., 2026). In contrast, H5 and H6 were not supported. The findings indicate that OC neither moderated the relationship between SPM and SE nor influenced the indirect effect of SPM on SPS through SE. Although previous studies have suggested that supportive organizational cultures facilitate sustainability initiatives (Hartnell et al., 2011; Linnenluecke & Griffiths, 2010), the present findings imply that stakeholder engagement remains an effective mechanism irrespective of variations in organizational culture. One possible explanation is that construction projects involve extensive collaboration among multiple external stakeholders, including contractors, consultants, government agencies, suppliers, and local communities. Consequently, stakeholder engagement may be driven more by project governance requirements and external stakeholder expectations than by internal organizational culture (Piwowar-Sulej & Iqbal, 2025). Another plausible explanation is that sustainability-oriented project management practices have become increasingly institutionalized within the construction sector, reducing the influence of organizational culture on stakeholder-related processes. These findings suggest that while organizational culture contributes to organizational functioning, it may not represent a significant boundary condition for stakeholder engagement within sustainability-oriented construction projects.

### 5.1 Theoretical Implications

This study makes several important theoretical contributions to the SPM literature. First, it extends Stakeholder Theory by demonstrating that stakeholder engagement functions as a key behavioural mechanism linking SPM with SPS. Although previous studies have established direct relationships between sustainability practices and project outcomes, limited empirical evidence has explained the process through which these relationships occur. By identifying stakeholder engagement as a partial mediator, the study advances understanding of the mechanisms underlying sustainable project performance. Second, the study contributes to Contingency Theory by examining the contextual role of organizational culture. Although the hypothesized moderating effects were not supported, the findings remain theoretically meaningful because they suggest that the effectiveness of stakeholder engagement is relatively stable across different organizational cultures within Pakistan's construction sector. This contributes to the ongoing discussion regarding contextual influences on sustainability-oriented management practices and indicates that other organizational or institutional factors may represent more influential boundary conditions. Finally, the study contributes to the broader sustainability literature by providing empirical evidence from Pakistan, an emerging economy that remains underrepresented in SPM research. By extending the geographical scope of existing knowledge, the findings respond to recent calls for greater contextual diversity and strengthen the external validity of sustainability theories beyond developed economies.

### 5.2 Practical Implications

The findings offer several practical implications for project managers, construction firms, and policymakers. First, organizations should integrate sustainability principles throughout the project lifecycle rather than treating sustainability as a separate project objective. Embedding environmental, social, economic, and governance considerations into project planning, implementation, procurement, risk management, and performance evaluation can substantially improve long-term project outcomes. Second, project managers should prioritize stakeholder engagement by establishing transparent communication channels, promoting participatory decision-making, and strengthening collaborative governance throughout project implementation. Since stakeholder engagement was identified as the primary mechanism linking SPM to SPS, investments in stakeholder relationship management, communication systems, conflict resolution mechanisms, and stakeholder training are likely to improve both project performance and sustainability outcomes. Third, policymakers and regulatory agencies should encourage the adoption of sustainability-oriented project management through national guidelines, industry standards, capacity-building initiatives, and incentive mechanisms. Such initiatives would facilitate the wider implementation of sustainable construction practices while improving project quality, stakeholder satisfaction, and long-term infrastructure sustainability.

### 5.3 Policy and Sustainable Development Implications

The findings have important policy implications for sustainable infrastructure development and are closely aligned with the United Nations Sustainable Development Goals (SDGs), particularly SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). By demonstrating the importance of sustainability-oriented project management and

stakeholder engagement, the study highlights the need for policies that encourage responsible project governance and sustainable construction practices. Government agencies and regulatory bodies should therefore promote sustainability through comprehensive policy frameworks, professional training programs, procurement guidelines, and industry standards that encourage stakeholder participation and sustainability integration throughout the project lifecycle. Such policy initiatives can contribute to more resilient infrastructure systems while supporting long-term economic, environmental, and social development.

## 6 CONCLUSION

Drawing upon Stakeholder Theory and Contingency Theory, a moderated mediation framework was developed and empirically tested using survey data collected from 350 construction professionals and analyzed through Hayes' PROCESS Macro. The findings demonstrate that SPM significantly enhances SPS both directly and indirectly through SE. Specifically, sustainability-oriented project management practices improve stakeholder participation, communication, collaboration, and trust, which subsequently contribute to superior sustainable project outcomes. These findings highlight stakeholder engagement as a critical behavioural mechanism through which sustainability practices create long-term project value. In contrast, the moderating role of organizational culture was not supported, indicating that the effectiveness of stakeholder engagement remains relatively stable across different organizational cultural settings within the sampled organizations.

### 6.1 Limitations and Future Research

Despite its contributions, this study has several limitations that should be considered when interpreting the findings. First, the cross-sectional research design limits the ability to establish causal relationships among the study variables. Future studies may employ longitudinal research designs to examine how sustainability-oriented project management influences project success over time. Second, the study relied on self-reported survey data, which may introduce common method bias despite the procedural remedies implemented during data collection. Future research may combine survey data with objective organizational or project performance indicators to improve methodological robustness. Third, the empirical analysis was limited to Pakistan's construction industry. Consequently, the generalizability of the findings to other industries, countries, and institutional contexts should be interpreted with caution. Replication across different sectors and emerging and developed economies would enhance the external validity of the proposed framework. Fourth, the study examined only one mediating mechanism and one contextual moderator. Future studies may investigate additional mediating variables, such as organizational learning, project resilience, knowledge sharing, project governance, innovation capability, or digital transformation, together with moderating factors including leadership style, organizational readiness, institutional support, environmental uncertainty, and project complexity. Finally, although organizational culture was conceptualized as a contextual factor, future research may examine specific cultural dimensions rather than overall organizational culture to obtain a more nuanced understanding of how internal organizational characteristics influence sustainability-oriented project management.

## ARTIFICIAL INTELLIGENCE (AI) STATEMENT

Artificial intelligence (AI)-assisted tools were used solely to improve the language, grammar, readability, and presentation of this manuscript. The authors were fully responsible for the study design, data collection, analysis, interpretation of the results, and all scientific content, and they reviewed and approved the final version of the manuscript.

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