DOI: 10.71317/jgst.2.05.2026.819
Journal of Global Social Transformation
Journal homepage: https://rjsaonline.org/index.php/JGST

Green Project Management and Project Success in The Construction Industry: The Mediating Role of Circular Economy Practices and Moderating Role of Stakeholder Engagement

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ARTICLE INFO

Submission:
April 19 , 2026
Revised:
May 16, 2026
Accepted:
May 20, 2026
Available Online:
May 30, 2026

Keywords:
Green project management practices; Circular economy practices; Stakeholder engagement; Project success; Construction industry.

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ABSTRACT

The effect of green project management practices on project success in the construction industry examines and explaining in this study. This relationship explores with circular economy practices as mediator and role of stakeholder engagement as a moderator, under theories, Resource-Based View (RBV) and stakeholder theory. Participants of this study didn't randomly select from the whole population but were simply collected responses from 253 business owners and senior managers from construction industry in Pakistan. The SEM "structural equation modeling" as technique and statistically used to examine relationships between several variables. The circular economy practices acting as a mediating pathway that directly and indirectly improve and significantly enhance project success. Stakeholder engagement, which acts as a moderator and amplifying positive impact of green project management practice on project success. As increasing the engaged of stakeholders, strengthening this relationship. All proposed direct and indirect relationships in the model were statistically significant. The practical implications of this findings for construction industry for leaders and managers, are suggested to adopt green project management practices with strong stakeholder engagement, and boost circular economy adoption and lead to improve project success. Theoretically, the study contributes to the literature by showing that green project management practices and circular economy practices are significant predictors of project success, and highlighting that role of stakeholder engagement enhances and make these practices more effective and sustainable in construction industry.

Introduction

Organizations are increasingly redefining the meaning of project success, pushed by hurdle such as change in climate, degradation of environmental resource scarcity, and evolving societal expectations and found that sustainable project management enhance

sustainable project success with involvement of stakeholder engagement (AHMAD & Muhammad Waseem, 2026). (Mosly, 2025) demonstrated in a study that cement production along building activities generates the most emissions and expansion of population and patterns of urban growth create highest levels of emission. In a study also mentioned that construction industry contributes to global environmental degradation and accounting for an estimated 20–40% global energy and generating a substantial share of carbon emission. The impact of economic and effectively environmental sustainability into construction industry and relate to project success require coordinated action across the industry (Phung et al., 2026). Organizations across all sectors face increasing environmental pressures simply to remain competitive (Miceli et al., 2021), set this challenge against a backdrop of major global concerns such as air pollution and water pollution, climate change, deforestation and loss of biodiversity loss (Qi et al., 2020).

Addressing these problems require comprehensive and sustainable solutions (Al-Shetwi, 2022) and (Hafez et al., 2023) find that it is essential to make sustainable development and green project management for sustainable future. Sustainable materials, energy-efficient systems, and integrated design help significantly to reduce waste, improve energy, and minimizing carbon emissions (Ma & Hao, 2024). While collaboration among, businesses, governments, and communities play an important role in protecting and enhancing community's biodiversity and advancing innovative building solutions (Kiss et al., 2022). Green management strategies are embedding sustainable practices within organizations to promote environmental responsibility (Amjad et al., 2021), argued that it is enabling firms to reduce their environmental footprint, optimize resource use, and improve performance of green building (Chi et al., 2020).

The success of green building requires a robust green management strategy (Wen et al., 2020). He noted that GMS facilitate compliance with green building certification requirements and also help to align organizational operations with waste sustainability goals. (Rehman et al., 2021) argued that integrates ecological considerations into operations, and supporting waste reduction constantly and without interruption control pollution. This strategy drives a central role in forming green building outcomes. (Franco et al., 2021), also helping to provide structural approaches that support compliance with environmental standards and regulations. He also argued that advancement of green building practices goes on in adoption of new technologies, designs, and construction process. (Afum et al., 2020) explore about efficiency and operational improvement on market reputation. Further, strengthen teamwork particularly exchange of idea and communication is an important part of success of projects of green building (Mustaffa et al., 2021). (Yang et al., 2023) argued that being in pressure of climate change and resource scarcity, green management strategies have become essential in guiding the shift toward a sustainable economy. The practice of circular economy basically supports sustainable development. It strengthens organization's ability to handle all challenges such as climate change including other hurdle of environment in construction projects (Munaro et al., 2020a). Each element of the circular economy uniquely contributes to organizational sustainability. For example, reduction minimizes waste and improves production efficiency (Bait et al., 2020). Reuse extends lifecycle of materials (Schützenhofer et al., 2022). Recycling reduces cost and improves efficiency and returning waste materials to the construction process (Sheth, 2016). Research on ecological benefits of green building success remains limited (Jaradat et al., 2024). (Komurlu et al., 2024) argued that green building initiatives also exert significantly positive influence on community well-being, which in turn contributes to wider adoption. However, several barriers exist in sustainable development and have been identified and highlighted the need for efficient and functional strategies that effectively overcoming social, economic, and technical challenges without hurting the earth. Accordingly, the primary aim of current study is to examine impact of sustainable management practices associate with project success with circular economy mediation role and moderation of stakeholder engagement.

While prior literature has mainly examined green building success as outcome of interest. This study extends the line of inquiry, uses project success as the dependent variable and their broader applicability across diverse construction project. Their relevance better reflects how owners and top managers evaluate outcomes not only in environmental performance but overall project delivery. Research work is continued on green building certification schemes, but notable gaps still remain regarding relationship between strategies of green management and outcomes of project (Komurlu et al., 2024). While numerous studies exist on strategic management and practices of circular economy (Verleye et al., 2024). So, yet no studies have explored under mediate of circular economy practices and moderation of stakeholder engagement between green management practices and project success (Ma & Hao, 2024). It is not yet examined in Pakistan. The methodology used in current study has not previously been applied.

Research Objectives

- To explore the association between green project management practices and project success in construction sectors.
- To examine whether circular economy practices mediate the association between green project management practices and project the relationship between green project management practices and project success in sector

- To examine whether stakeholder engagement moderates the association between green project management practices and project success in construction sector.

Research Questions

- What is the association between green project management practices and project success in sector of construction?
- Do circular economy practices mediate the link between green project management practices and project outcomes in construction sector?
- Does stakeholder engagement moderate the association between circular economy and success of project in construction sector.

Literature Review

Literature review (LR) play an important role by providing evidence for proposed model in research study and highlights the connection between green project management practice (GPMp), circular economy practices (CEp), and stakeholder engagement (SE), with their impact on project success (PS) in construction sectors. In current study literature review were adapted to be used to identify and referencing previously tested questionnaires. The research aim is to examine how to adopt sustainable link between green project management and project success in construction sector and influence on overall outcome and success of projects. The current investigation explored green project management with association to success of project and the review is focused on circular economy practices as mechanism that mediate, through which green project management influences project success. Then stakeholder engagement examined as moderator of the model in context of construction sectors. Sustainable construction highlights to minimiz environmental impacts across a building's entire lifecycle. (Hwang & Ng, 2013) argued that success of construction projects is based on role played by manager and it is important to know the critical skills and knowledge of project manager and needs to effectively execute a green construction. A unique challenge in green building projects including material selection, waste management, and energy efficiency optimization. These complexities are because of green buildings aim to exceed minimum environmental standards and include integrating advanced and sustainability materials into construction (Noman et al., 2022).

Resource-Based View

The theory Resource-Based View (RBV) discussed by (Barney, 2021). (Purba et al., 2023) argued that the concepts include inimitable, rare, valuable and resources and are not substitutable resources. RBV is regarded as a theory and strategic management that explains internal capabilities and unique resources enable organizations to achieve competitive success (Nayak et al., 2023). Similarly, RBV theory holds circular economy practices as a unique organizational capability, contributes to success of project (Farrukh et al., 2023). Within this framework, green project management practice support compliance within an environmental and regulatory standard and regarded as a strategic asset of the organization.

Stakeholder Theory

Stakeholder theory (Freeman & McVea, 2001), 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 to successful project implementation (Aaltonen & Kujala, 2016). Stakeholders are not merely as external actors; it also emphasizes their active participation throughout whole 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 (Wu et al., 2023). Stakeholder theory thus helps explain how stakeholder engagement shapes sustainable management and make effective of practices and influencing project success.

Empirical Review

The Relationship between Green Project Management Practices and Project Success

The relationship between green project management (SPM) and project success (PS) has been examined in a number of studies and found positive SPM–PS relationship consistently identified. (Martens & Carvalho, 2016), Examined this relationship and found SPM with a significant, positive effect on PS. Similarly, various studies across various regions including china (Wu et al., 2023), Pakistan (Shaukat et al., 2022), and (Zaman et al., 2020.), United Arab Emirates (Watfa et al., 2023), and the United Kingdom (Phung et

al., 2023) have shown SPM had a positive effect on project success of construction sector. In sector of manufacturing in Malaysia, (Chow et al., 2021) examined that GPM had a positive influence on PS and argued that sustainability plays crucial role in project success. Based on this body of literature, it is proposed that GPM practice hold a significant positive effect on outcome of project in construction sector. Accordingly, given hypothesis is proposed.

H1. Green project management practices positively impact project success in construction sectors.

Green Project Management Practices and Circular Economy

The integration of circular economy principles into project management is essential for advancing sustainability and enhancing resource efficiency (Yetunde Adenike Adebayo et al., 2024a). Green project practices refer to organizations that adopting practices as eco-friendly to reduce negative impact and harmless operations on the surrounding (Usman et al., 2023). Project management is grounded in initiatives green and optimizing process for sustainable design of product. Circular economy practices, in turn, encompass several interrelated concepts reduction, reuse, recycling, and recovery (Morseletto, 2020), each of which contributes equally to organizational sustainability. The primary purpose of circular economy as a mediator is to reduce consumption of resource, a sustainable value chain to be created and unwanted materials to be minimized (Ogunmakinde et al., 2022). (Tang et al., 2022) argued about strategy of green management which exerts a positive influence on circular economy and lower waste in production process and fostering more flexibility in business model. (Bertassini et al., 2021), explored that sustainable management strategy drives circular economy in organizations, which strengthening sustainability in long-term to cultivate green organizational culture. (Kwarteng et al., 2022), highlighted influence of project management practices on practice of circular economy. Furthermore, green project practices align processes of organization with legal requirements of environment set by regulatory bodies, while mitigating risks associated with scarcity of resource and disruptions of supply chain (Hilend et al., 2023). Based on this body of literature, hypothesis is proposed as follows.

H2. The association between green project management practices and circular economy practices is positively significant.

Circular Economy practice and Project Success

The practices of circular economy play positive role on project success by reduction of carbon emission and resource consumption (Chawla et al., 2022). When circular economy practices is in process help to achieve sustainability throughout construction and process of production (Dsilva et al., 2023). According to (Giorgi et al., 2022), by implementing circular economy in green building enables firms more efficiently use resources and achieve better savings in cost of production process. (Munaro et al., 2020b), explored that circular economy practices in project success as known as a vital part in sustainable development. The primary attention on circular economy is to better use of resources boosting reuse and materials recycle to pursuit success of green building. (Colorado et al., 2020), argued about circular economy particularly process in manufacturing sector, it helps to reduce emissions of carbon and waste. (Chizaryfard et al., 2021) study in construction organizations and found that CEp reduces negative impact of unwanted materials. (Shooshtarian et al., 2022) argued that the actively leveraging circular economy practices, which in turn drive waste management practices that enhance the likelihood of project success. (Thirumal et al., 2024), explored about synergistic effect of CEp on project success in construction sector that enhance financial transparency and costs associated are reduced along procurement and waste disposal. In study (Haseeb et al., 2019), achieving green project success, organizations gain the advantages of sustainable competitive and improved market efficiency.

Based on this body of literature, it is proposed that circular economy practices exert a significant, positive effect on project success in construction sector. Accordingly, the hypothesis is proposed is followed.

H3. The association is significant between circular economy practices and project success in construction sector.

The Mediating Role of Circular Economy Practices

(Morea et al., 2021), argued about green economic strategies and link organizations to social responsibility of corporation by strengthening CEp within a firm. (Bui et al., 2022), explored strategies of Project management and provide clear guidelines to isolate waste and segregate parts of recycling, and thereby enhancing waste reduction and resource recovery. Circular economy practices function as the mechanism connecting green project management to project success. Green project management practices give rise to circular economy practices, which in turn drive project success, as a causal chain (GPM $\rightarrow$ CE $\rightarrow$ PS) consistent with mediation. It is therefore concluded that CEp significantly act as mediation on association between green project management

practices and project success. To confirm how this mediating effect operates within the construction industry, the hypothesis is proposed as following:

H4. Circular economy practices (CEp) mediate the association between green project management practices (GPMp) and project success (PS) in construction sector.

The Moderating Role of Stakeholder Engagement

Effective stakeholder plays an important role in a successful adoption of (CEp) circular economy practices, facilitating collaboration and ensure about diverse interests and expectations that are addressed (Yetunde Adenike Adebayo et al., 2024b). According to stakeholder theory (Freeman & McVea, 2001) construction sector involves with wide range of stakeholders including legitimate interests and an organizational operations and performance. Stakeholders are demonstrated in concern and interest for a business to enhance returns. They can directly or indirectly influence progress and success of a project. The sustainability success, and performance of project are strengthened through active participation of stakeholders. It is therefore concluded that engagement of stakeholder plays a significant role in moderating relationship between green project management practices and project success. Based on this body of literature, the following hypothesis is proposed:

H5. Stakeholder engagement positively moderates the relationship between green project management practices (GPMp) and project success (PS) in the construction industry.

Methodology

Data Collection and Sample Size

A quantitative research approach used in current study with collection of data through a survey questionnaire and followed a deductive research approach. The target of population comprised organizations within the construction sector of Pakistan, with data collected from five major cities as convenience technique. Such as Islamabad, Lahore, Karachi, Faisalabad, and Quetta. Morgan's table is Followed for sample size and determination. Survey questionnaires were distributed through email, WhatsApp, social media, and other channels of communication.

Variables measurement

As the primary purpose of current study is to explore role of (GPMp) in achieving (PS) along mediating effect of (CEp) with moderation influence of stakeholder engagement. According to (Gunarathne et al., 2021), green project management practices act as the independent variable and were measured using five items.(CEp), comprise four dimensions reduction, measured three items calculated from (N. M. Nameghi & Shadi, 2013), and (Manzar et al., 2024) reuse, measured three items calculated from (N. M. Nameghi & Shadi, 2013) , and (Manzar et al., 2024), recycling, measured three items calculated from (N. M. Nameghi & Shadi, 2013), and (Manzar et al., 2024) and recovery, measured four items depend on (Wiguna & Yadnyana, 2019) and (Manzar et al., 2024). Stakeholder engagement, which is moderating variable, was measured using ten items depend on (Waris et al., 2019). Project success as a dependent variable, measured four items calculated from (Phung et al., 2026). He explored, that there is a pressing need to understand how sustainability adoption impacts modern project success beyond cost–time–quality measures.

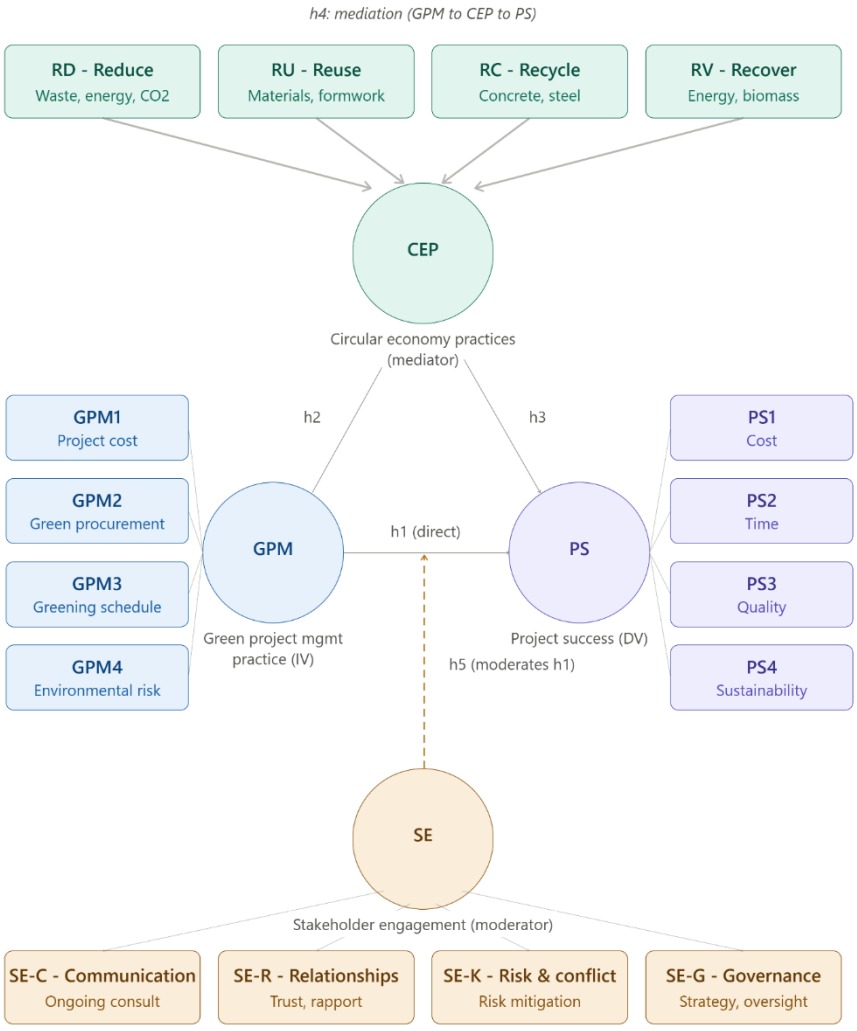
Table 1: Measurement of Variable

S.No	Main Variable Name	Items	Sources
1	Green project Management practice(IV)	Environmental policy and commitment 2. Green project planning 3. Green procurement 4. Green project execution 5. Green project monitoring and evaluation	(Gunarathne et al., 2021)

3	Circular economy practices (Mediator)	Reduce: 1. Reduce material waste 2. Reduce energy consumption 3. Reduce carbon footprint Reuse: 1. Reuse of building materials 2. Reuse of formwork & temporary structures 3. Adaptive reuse of existing buildings Recycle: 1. Recycle concrete & masonry 2. Recycle steel & metal 3. Recycle plastic, glass & wood Recover: 1. Waste-to-energy 2. Recovery of biomass for fuel 3. Material recovery for downcycling	(N. M. Nameghi & Shadi, 2013) & (Manzar et al., 2024) (N. M. Nameghi & Shadi, 2013) & (Manzar et al., 2024) (N. M. Nameghi & Shadi, 2013) & (Manzar et al., 2024) (Wiguna & Ketut , 2019) and (Manzar et al., 2024)
4	Stakeholder engagement (Moderator)	1. Effective communication 2. Continuous consultation 3. Understand intention and behaviours 4. Implement strategy 5. Build good relationships 6. Analyse changes 7. Risk mitigation 8. Compromise conflicts 9. Understand project success 10. Good project governance	(Waris et al., 2019)
5	Project Success (DV)	Cost Time Quality Sustainability outcoms	(Phung et al., 2026)

Conceptual Framework

Modelling Project Success in construction Sector



Common Method Bias

CMB assessed to safeguard accuracy, validity, and credibility of study's findings. Several procedural remedies incorporated during research design stage to minimize the risk of CMB. The questionnaire administered to respondents in a randomized order, respondent anonymity was assured, and the independent, mediating, moderating, and dependent constructs were clearly separated and distinctly worded within the instrument to reduce the likelihood of respondents inferring the hypothesized relationships between constructs. In addition to these procedural controls, CMB was formally tested using full collinearity test approach which was recommended by (Kock, 2015), whereby (VIF) values were computed for all structural model. All VIF values were found to be below the threshold of 3.3, suggesting the common method bias is unlikely to be a significant in this study.

Profile of Respondents

Data were collected from a total of 253 respondents comprising owners and project managers operating within the construction sector. Respondents' ages ranged from 25 years to 55 years and above, and their educational qualifications ranged from intermediate-level education to PhD level. The sample Male and female both are included as respondents and roles of owner or project manager are occupying. In terms of geographic distribution, respondents were from four major cities. Lahore at 30%, which is counted as the largest share, 28% from Karachi, at 25% from Islamabad and Quetta at 17%.

Results

The SmartPLS were used to test the theoretical model in this study because SmartPLS is regarded as a leading analytical tool to handle complex models that carry both mediating and moderating relationships between dependent and independent variables. The software offers comprehensive output and visual representation of results. It provides strong acceptance in academic community and support for advanced statistical procedures. Its practical value lies in its ability to uncover the interrelated pathways such as circular economy practice and engagement of stakeholders among constructs and providing an accurate assessment of reliability and validity measurement and study's structural models. A further justification of its use that apartial least squares structural equation modeling (PLS-SEM) not require normally data distributed (TomassMHultt, 2021.). This helps to address potential concerns regarding data normality in this study.

Discriminant Validity

Discriminant validity shows that how distinct each construct is from others in model. There are two criteria used to assess discriminant validity. 1. Fornell-Larcker criterion, 2. (HTMT) ratio. It is logic behind Fornell-Larcker criterion that square root of each construct's Average Variance Extracted (AVE) should exceed its correlations with other constructs. As shown in Table 2. This condition right and met for all constructs and supporting validity discriminant. (HTMT) ratio examined a threshold below 0.90 in case of more conservative 0.85 which is depending on standard applied and indicating that constructs are sufficiently distinct. Values exceeding threshold indicated a lack of discriminant validity. That is shown in Table 3. All HTMT ratios were below the threshold and confirming discriminant validity.

Convergent validity assessed separately which is using outer loadings. (AVE) establish for reliability of convergent validity and its value must exceed 0.50, and composite reliability (CR) supported when outer loadings exceed 0.70. Result shown in Table 2. All indicators met these thresholds and confirming convergent validity.

Table 2: Convergent Validity

Variables	Items	Loadings	Cronback's Alpha	CR	AVE
GreenProject	GPMp	0.89	0.906	0.932	0.732
management	GBc	0.859			
practice	GBs	0.881			
	GBp	0.82			
	GBe	0.864			
Project Success	PS1	0.875	0.97	0.904	0.809
	PS2	0.855			
	PS3	0.859			
	PS4	0.847			
Stakeholder	SE1	0.78	0.89	0.908	0.822
engagement	SE2	0.79			
	SE3	0.82			
	SE4	0.90			
Circular economy:					
Recycle	REC1	0.88	0.92	0.943	0.712
	REC2	0.79			
	REC3	0.92			
Recovery	RECO1	0.93	0.96	0.951	0.54
	RECO2	0.84			
	RECO3	0.83			
Reduce	RED1	0.86	0.88	0.838	0.664
	RED2	0.89			
	RED3	0.91			

Reuse	REU1	0.94	0.98	0.827	0.631
	REU2	0.88			
	REU3	0.92			

According to Table 2, all the values are shown, which support the establishment of convergent validity."

Table 3: HTMT Ratio

1	PS	GPMp	SE	CEp	Recy	Reco	Red	Reu
PS								
GPMp	0.174							
SE	0.432	0.453						
CEp	0.564	0.543	0.543					
Recy	0.653	0.432	0.321	0.421				
Reco	0.433	0.543	0.701	0.354	0.732			
Red	0.451	0.344	0.432	0.540	0.432	0.471		
Reu	0.531	0.191	0.321	0.564	0.412	0.621	0.521	

According to Table 3, all HTMT ratios are below the threshold of 0.90 (with the highest value being 0.732 between Recycle and Recovery), indicating that discriminant validity has been established among the constructs.

Structural Model Assessment

Following assessment of measurement model and structural model evaluated to determine the significance of proposed relationships, based on path coefficients, t-values, and standard errors. (Ringle et al., 2014), used the bootstrapping procedure in SmartPLS, the direct and indirect influence of variables association were hypothesized are tested.

Table 4: Direct Relationships

Relationships	Beta	StDev	t-statistics	P-values	Decision
SE →PS	0.74	0.015	4.054	0.00	Supported
GPMp →Rec	0.0431	0.023	2.950	0.01	Supported
GPMp →Reco	0.476	0.050	8.098	0.00	Supported
GPMp →Red	0.521	0.050	4.870	0.00	Supported
GPMp →Reu	0.620	0.043	4.99	0.03	Supported
Rec→PS	0.439	0.043	6.345	0.04	Supported
Reco→PS	0.565	0.063	2.654	0.01	Supported
Red→PS	0.057	0.054	8.543	0.03	Supported
Reu→PS	0.065	0.046	9.760	0.044	Supported
SE* Rec→PS	0.047	0.075	11.96	0.030	Supported
SE* Reco→PS	0.026	0.049	3.976	0.045	Supported
SE* Red→PS	0.475	0.076	2.060	0.032	Supported
SE* Reu→PS	0.078	0.073	7.045	0.034	Supported

Note: in table 4, all direct relations of variables were found to be significant and supported. Stakeholder engagement had a significant positive relationship with project success ($\beta = 0.74$, $t = 4.054$, $p < 0.05$). Green project management practices also had significant relationships with circular economy practices, including recycling ($\beta = 0.0431$, $t = 2.950$, $p < 0.05$), recovery ($\beta = 0.476$, $t = 8.098$, $p < 0.05$), reduction ($\beta = 0.521$, $t = 4.870$, $p < 0.05$), and reuse ($\beta = 0.620$, $t = 4.99$, $p < 0.05$). Similarly, circular economy practices had significant effects on project success, including recycling ($\beta = 0.439$, $t = 6.345$, $p < 0.05$), recovery ($\beta = 0.565$, $t = 2.654$, $p < 0.05$), reduction ($\beta = 0.057$, $t = 8.543$, $p < 0.05$), and reuse ($\beta = 0.065$, $t = 9.760$, $p < 0.05$). Additionally, stakeholder engagement significantly moderated the relationships between circular economy practices and project success, including recycling ($\beta = 0.047$, $t = 11.96$, $p < 0.05$), recovery ($\beta = 0.026$, $t = 3.976$, $p < 0.05$), reduction ($\beta = 0.475$, $t = 2.060$, $p < 0.05$), and reuse ($\beta = 0.078$, $t = 7.045$, $p < 0.05$).

Table 5: Indirect Relationships

Relationships	Beta	StDev	t-statistics	P-values	Decision
GPMp →Rec →PS	0.27	0.045	2.074	0.001	Supported
GPMp →Red →PS	0.054	0.050	2.46	0.003	Supported
GPMp →Reu →PS	0.045	0.023	3.71	0.002	Supported
GPMp →Reco →PS	0.43	0.076	3.56	0.003	Supported

Discussion

The results indicate that all direct and indirect relationships in the model were significant. Green project management practices were found a significant influence on project success, largely by promoting (CEp) in construction firm and thereby reducing negative environmental impact. This study highlights mediating path of circular economy practices across its four core dimensions, reduction, reuse, recycling, and recovery, each of which contributes meaningfully to project outcomes. In particular, circular economy practices support project success by encouraging efficient energy use, adoption of sustainable materials, and operational processes. (Li et al., 2022). The findings indicate that organizations can achieve greater project success by integrating green project management strategies with circular economy practices rather than pursuing them in isolation. According to (Pan et al., 2022), effective circular economy practices strengthen firm's capacity to minimize waste, reuse materials across project phases, recycle resources back into the supply chain, and recover value from what would otherwise be discarded. (Liu et al., 2017) argued about effectiveness of (GPM) practices that it further enhances the sustainability of organizational operation. However, this finding aligned with (Ferreira Gregorio et al., 2018) also argued that GPMp influence on project success might be not much pronounced without the incorporation of CEp. The principles rule of CEp help aligns organizational operations and boost toward greater efficiency in use of resources and sustainability (Suárez-Eiroa et al., 2019).

The results also confirm a significant moderating role of stakeholder engagement in project success, with stakeholder engagement significantly strengthening the relationship between nearly every circular economy dimension and project success. This finding aligns with prior research, (Subramanian & Suresh, 2022), which similarly demonstrates that greater stakeholder engagement helps organizations build stronger proficiency on both GPM practices and CEp. Technological challenges, cost and logistical challenges can constrain a firm's operations and efficiency. However, (Hassan et al., 2026.),demonstrated that delegating power engagement of stakeholders enhances qualitative performance and satisfaction of stakeholder and project success.

Conclusion and Recommendations

The primary aim of current study is to find the role of green project management practices in achieving project success, via mediating effect of CEp and moderating effect of stakeholder engagement. These findings demonstrate that green project management practices enhance project success by embedding circular economy practices reduction, reuse, recycling, and recovery into an organization's regular operations. This study contributes a unique value by offering organizations a clearer pathway for achieving project success through the integration of environmental sustainability into project management. All direct and indirect hypotheses were tested using SmartPLS. For measurement and assessment of structural models. SmartPLS was selected as a robust and appropriate tool for achieving the research objectives, and the results confirm these relationships in the proposed model are significant. Overall, the findings indicate that project success in the construction industry is strongly dependent on effective adoption of green project management practices, circular economy practices, and further reinforced by active stakeholder engagement.

Limitations

Several limitations exist in this study. It is crosswise design hold relationships at a one point in time. As it limits insight that how develop or hold over a project's lifecycle. while the sample of 253 respondents were adequate for the analyses which is conducted. Its relatively modest size may constrain generalizability across broader sector. This study also examined a set of variables, green project management practices, circular economy practices, stakeholder engagement, and project success but not accounted for other relevant constructs. The data collection was belonged to a specific geographic area that may limit the applicability of findings to regions with different regulatory environments or industry practices.

Practical Implications

This study offers some practical guidance for project managers and organizational leaders of construction sector. The green practices deliver the greatest value for project manager when embedded across the full project lifecycle. Circular economy practices emerge as a practical lever for converting green commitments into measurable results for decision makers and reduction, reuse, recycling, and recovery contribute to project success, each one offering a concrete pathway to reduce environmental impact while improving performance. Stakeholder engagement should be as a strategic capability that strengthens returns on green and circular investments. Structured engagement and aligned with logistical challenges of green practices. The adoption of circular economy eases regulatory pressure around, and tightly regulated markets may find early investment and reduces long-term compliance costs to improving project outcomes.

Theoretical Implications and Recommendations for Future Research

Building on theoretical contributions of this study several recommendations are for future research and practice. Studies in future should investigate the mechanisms through which CEp mediate the link between GPMp and PS by examining the relative strength of four circular economy dimensions individually. Researchers can also extend this theoretical model by incorporating constructs of green in supply chain management, market orientation, entrepreneurial orientation, knowledge management and innovation, which improve the sustainability literature and provide a comprehensive framework of project success. As stakeholder engagement was presenting as a significant moderator. Therefore, future research should explore the specific dimensions of stakeholder engagement. Such as communication frequency, consultation depth, or trust building that contribute most strongly to power this relationship. This would be refined of theoretical models that how stakeholder dynamics interact with sustainability practices. Since this study contributes to sustainability literature of construction sector. Future researches are recommended to test whether these theoretical relationships can hold across other sectors and allowing for broader and waste theoretical validation.

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