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GREEN FINANCING AND SUSTAINABLE DEVELOPMENT: DECODING THE 'HOW'?

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Abstract
This study examines the influence of green finance (GF) on sustainable development (SD) by examining its influences on innovative green projects (IGPs) and sustainable investment strategies (SIS). The study uses a quantitative research design and surveys 138 professionals from India engaged in sectors such as renewable energy, environmental-based consulting firms, infrastructure (including transportation), and green finance (GF). The study finds that green finance has a significant influence on both IGPs and SIS. The study used SEM tools and other appropriate statistical and econometric techniques to analyse direct and mediated interactions. The study finds that IGPs and SIS moderately facilitate the connection between green financing (GF) and sustainability results. The study's findings highlight that individuals across diverse sectors significantly influence perceptions of green finance success, with the renewable and infrastructure sectors showing the highest alignment with sustainability objectives. The research model showed that the variables selected exhibit strong positive statistical validity, confirming that a well-structured green finance (GF) outline may be a planned driver of long-term conservation and socio-economic transformations. The study also emphasizes the grave necessity of allocating financial resources to innovative and sustainable investments to achieve long-term developmental goals. The research also examines the role of green finance (GF) in nurturing a sustainable future and provides actionable recommendations for regulators, sustainability experts and other stakeholders.
Keywords: Green Financing, Sustainable Development (SD), Innovative Green Projects (IGP), Sustainable Investment Strategies (SIS), Environmental Transformation

1 Introduction

The global financial system is under mounting pressure to align capital allocation with sustainability imperatives. In the wake of the Paris Agreement, the United Nations Sustainable Development Goals (SDGs), and escalating regulatory mandates across major economies, green finance (GF) has emerged as a central policy and market mechanism for redirecting investment toward environmentally responsible and socially inclusive outcomes (Bolton and Kacperczyk, 2020; Baker et. al., 2022; Sachs et al., 2019a; Ozili, 2022). Green finance encompasses a broad range of instruments, including green bonds, sustainability-linked loans, ESG-integrated portfolios, and concessional climate funds, that are designed to channel private and public capital into projects generating measurable environmental and social co-benefits alongside financial returns (Ouazad and Kahn, 2019; Painter, 2020; Falcone, 2020; Jian, 2023). Global green bond issuances surpassed USD 500 billion annually by the early 2020s, and institutional investors managing trillions in assets have progressively committed to ESG screening and net-zero portfolio alignment, reflecting a structural transformation in how financial markets conceptualise risk and value (Flammer, 2021; Ning et. al., 2023).

Nevertheless, despite this momentum, a fundamental question remains inadequately answered in the scholarly literature: through what specific mechanisms does green finance translate into tangible sustainability outcomes? The volume and growth of GF instruments are well documented. However, the organisational and strategic pathways through which green capital produces measurable improvements in environmental quality, social welfare, and economic sustainability are considerably less well understood (Ozili, 2022; Mahmood et al., 2024). This gap is particularly consequential in emerging economies such as India, where the sustainability transition is simultaneously the most urgent and the most institutionally constrained. India faces a distinctive challenge: it must decouple rapid economic expansion from environmental degradation while navigating fragmented regulatory frameworks, uneven institutional capacity, and a private sector that is only beginning to integrate ESG principles into core business strategy (Mohd & Kaushal, 2018; Jha & Bakhshi, 2019). Understanding how GF mechanisms operate in this context, rather than merely whether they exist, is essential for designing effective policy interventions and investment frameworks.

This study proposes that two specific organisational mechanisms serve as the critical pathways through which GF produces sustainability outcomes: Innovative Green Projects (IGPs) and

Sustainable Investment Strategies (SIS). IGPs refer to ecologically oriented initiatives that deploy emerging technologies, innovative processes, and sustainable practices, such as smart energy networks, clean-tech applications, and sustainable infrastructure, to generate measurable environmental and economic value. These are not simply funded projects; they represent the conversion of financial capital into innovation capability and, as such, constitute the primary vehicle through which GF produces technological and environmental change at the organisational level. SIS, by contrast, are financial decision-making frameworks that systematically integrate environmental, social, and governance (ESG) criteria into investment planning and portfolio construction. Through mechanisms including ESG screening, impact investing, and sustainability-linked performance metrics, SIS align the allocation of financial resources with long-term sustainability objectives, ensuring that GF is directed toward interventions with verifiable and durable outcomes.

The theoretical logic connecting GF, IGPs, SIS, and sustainability outcomes is grounded in three complementary frameworks. Institutional Theory (DiMaggio & Powell, 1983; Scott, 1995) provides the primary explanatory lens, positing that coercive regulatory pressures, mimetic industry norms, and normative professional expectations collectively drive organisations in sustainability-sensitive sectors to adopt GF mechanisms and translate them into structured innovation and investment behaviour. The Resource-Based View (Barney, 1991) complements this by explaining how organisations convert externally mobilised green capital into competitive sustainability capabilities through IGPs and SIS, capabilities that are firm-specific, difficult to replicate, and thus productive of durable sustainability advantages. Legitimacy Theory (Suchman, 1995) provides the third layer, explaining why organisations maintain and deepen GF engagement over time: GF adoption, innovative green project development, and ESG-aligned investment strategies function as visible legitimacy signals to regulators, investors, and communities, reinforcing the social licence to operate in an environment of escalating sustainability scrutiny.

Empirically, the study addresses three specific gaps identified in the extant literature. First, while existing research documents the macro-level association between GF and sustainability, very few studies have empirically modelled the micro-level organisational pathways, specifically IGPs and SIS as parallel mediators, through which green capital produces sustainability outcomes across all three ESG dimensions simultaneously. Second, existing mediation analyses in this domain are largely confined to single-sector or single-mediator designs; no study has simultaneously examined IGPs and SIS as dual mediating mechanisms across social, economic, and environmental sustainability within a multi-sector emerging-market sample. Third, the theoretical grounding of empirical GF research remains thin, with most studies relying on single-theory framings that fail to capture the institutional, resource-based, and legitimacy dimensions of GF behaviour in an integrated manner.

To address these gaps, this study employs a quantitative, explanatory research design. It collects data from 138 professionals across the renewable energy, environmental consulting, infrastructure, technology, and green finance sectors in India. Covariance-Based Structural Equation Modelling (CB-SEM) with bootstrapped mediation analysis is used to test the hypothesised direct and indirect relationships. The study makes three distinct contributions. Theoretically, it advances a multi-theoretic framework, integrating Institutional Theory, RBV, and Legitimacy Theory, that provides a richer and more complete account of GF behaviour than any single-theory model can offer. Empirically, it provides the first multi-sector, dual-mediator test of the GF → IGP/SIS → sustainability pathway using CB-SEM in an Indian professional context. Practically, the findings offer actionable guidance for policymakers, regulators, and institutional investors seeking to design GF frameworks that maximise sustainability impact through innovation and strategic investment channels.

The remainder of this paper is organised as follows. Section 2 reviews the relevant literature across four thematic streams while Section 3 develops the theoretical framework. Section 4 states the research problem, identifies the gaps, and articulates the research objectives. It also develops the hypotheses and each section of the literature review contributes to hypothesis development. Section 5 describes the research methodology. Section 6 presents the data analysis and results. Section 7 discusses the findings in relation to theory and prior empirical evidence. Section 8 presents the conclusions and practical recommendations while Section 9 discusses the limitations of the study and points to directions for future research.

2 Literature Review

The intersection of green finance (GF) and sustainable development (SD) has attracted considerable scholarly attention over the past decade, particularly as climate imperatives have intensified pressure on financial systems to redirect capital toward environmentally and socially responsible ends. This section reviews the relevant literature across four thematic streams: (i) GF as a driver of eco-innovation and technology; (ii) GF instruments and their measurable effects on sustainability outcomes; (iii) GF in emerging economies, with specific reference to India; and (iv) the mediating mechanisms connecting GF to sustainability. The review concludes with a theoretical synthesis and an explicit statement of the research gaps this study seeks to address and which also leads to the hypothesis of the study.

2.1 Green Finance as a Driver of Eco-Innovation and Technology

A well-established strand of the GF literature demonstrates that green financial mechanisms do more than allocate capital, they actively stimulate eco-innovation and accelerate technological change. Ahmed et al. (2024) conducted a thematic review establishing that GF functions simultaneously as a capital source and a strategic instrument for sustainable innovation, particularly in energy, transportation, and infrastructure sectors. Their analysis showed that green bonds and sustainability-linked loans catalyse long-term investments in eco-friendly technologies, with policy alignment and investor engagement serving as critical enablers. Relatedly, Ma and Chang (2023), drawing on panel data from 75 developing countries, found that nations with robust GF mechanisms exhibited significantly higher green patent applications and rates of technological diffusion. This cross-national evidence underscores GF's capacity to scale innovation across heterogeneous economic and institutional contexts.

Kwilinski et al. (2025) extended this line of inquiry by demonstrating that digital finance platforms, artificial intelligence, and blockchain technologies amplify the transparency and efficiency of green financial transactions, thereby strengthening GF's innovation impact. Their findings suggest that the relationship between GF and innovation is dynamic and technologically mediated, rather than a simple capital-allocation effect. Feng (2022) further contributed a cohesive analytical framework integrating finance, technology, and policy, showing empirically that the absence of a strong GF environment decelerates the transition to renewable energy, a finding with direct relevance for countries at early stages of the green transition. Khalatur and Dubovych (2022) examined financial engineering as a tool for managing GF portfolios, concluding that well-structured green financial instruments improve risk-return profiles and serve as catalysts for strategic innovations aligned with SD objectives. Collectively, this stream establishes that GF is an active enabler of innovation rather than a passive funding conduit, a relationship this study operationalises through the construct of Innovative Green Projects (IGPs).

2.2 Green Finance Instruments and Sustainability Outcomes

A second major research stream examines specific GF instruments, green bonds, sustainability-linked loans, ESG portfolios, and carbon pricing mechanisms, and their measurable effects on environmental, economic, and social sustainability. Jian (2023) analysed multiple global case studies of green bond issuances and found that these instruments are effective not only in financing renewable energy and sustainable urban transportation, but also in establishing transparent environmental accountability through clearly defined impact reporting requirements. Standardised green bond frameworks and government support were identified as critical for enhancing market liquidity and investor confidence. Another set of papers argue that to fund corporate innovations, financial innovations such as Green Bonds are gradually emerging (Miao and Popp (2014; Bolton and Kacperczyk, 2020; Flammer, 2021; Baker et. al., 2022). Another set of paper argues the financial reason behind green finance being linked to higher cost of capital of companies such as tobacco, energy, alcohol which are viewed as “sin stocks” (Heinkel, Kraus, and Zechner 2001; Hong and Kacperczyk, 2009). Painter (2020) shows that even municipal bonds are responding to potential climate risks. Ning et al. (2023), using a multi-country dataset, demonstrated that the issuance and uptake of green bonds significantly improved energy efficiency metrics and economic resilience, while also mobilising institutional investors, including pension funds and sovereign wealth funds, that would not otherwise engage with sustainability-focused instruments. Ouazad and Kahn (2019) show that mortgages in areas adversely affected by hurricanes are more likely to be securitized. This evidence is suggestive of the critical role played by finance industry in helping households manage climate risks.

Falcone (2020) demonstrated that policy instruments, including tax incentives, government subsidies, and carbon pricing, are essential complements to market-based GF tools, serving to bridge the gap between regulatory frameworks and actual market investment behaviour. This finding is particularly salient for emerging economies where market mechanisms alone are insufficient to redirect capital toward sustainable projects. Stojanovic and Ilic (2018) reinforced this point, showing that concessional grants and renewable energy subsidies reduce ecological financial risks while supporting long-term economic development. Hussain et al. (2024) provided banking-sector evidence that financial institutions offering green financial solutions consistently outperform peers on ESG indicators, and that fintech-enabled innovations extend GF effectiveness into underserved market segments. Zhang et al. (2022) similarly found that green banking practices generate measurable improvements in environmental performance, driven by a convergence of investor pressure, regulatory incentives, and corporate social responsibility commitments. This stream of research directly informs the construct of Sustainable Investment Strategies (SIS), establishing that GF instruments, when embedded within systematic investment decision frameworks, produce demonstrable outcomes across all three sustainability dimensions.

2.3 Green Finance in Emerging Economies and the Indian Context

The third stream of literature addresses GF within the institutional and developmental contexts of emerging economies, with India receiving increasing scholarly attention in recent years. Mohd and Kaushal (2018) identified the need for new financial architectures to support green development in India, highlighting energy conservation, environmental protection, and waste management as priority investment areas. Their research advocated for green banks, environmentally oriented credit lines, and investor capacity-building as foundational conditions for effective GF deployment. Jha and Bakhshi (2019) contextualised this further, noting that while India has made legislative progress on GF policy, substantive gaps persist between policy intent and on-the-ground sustainability outcomes, particularly in infrastructure, clean technology, and rural energy sectors.

Anas et al. (2024), employing the "load capacity factor" as a comprehensive environmental sustainability metric across emerging markets, found that rapidly industrialising nations can derive substantial benefits from GF, green technology investment, and natural resource conservation, but that these benefits are contingent on region-specific policy design rather than the adoption of generic universal frameworks. Sadiq et al. (2023) similarly demonstrated, in the ASEAN context, that GF's effectiveness in advancing the Sustainable Development Goals (SDGs) is moderated by national institutional capacity, eco-innovation ecosystems, and regulatory quality. Sachs et al. (2019a) concluded that GF is an indispensable pillar of the global sustainability agenda, advocating for green bonds, sustainability-linked loans, and carbon taxes as scalable tools, while stressing that international cooperation is necessary to direct adequate financial flows toward climate-vulnerable and lower-income nations. These findings reinforce the importance of empirically examining GF mechanisms within specific national contexts, the approach this study adopts through its India-based sampling strategy.

2.4 Mediating Mechanisms Linking Green Finance to Sustainability

Despite the breadth of literature reviewed above, a persistent gap remains: most existing studies examine GF's relationship with sustainability at the macro or instrument level, without modelling the specific organisational and strategic pathways through which green capital translates into sustainability outcomes. The roles of IGPs and SIS as active mediating mechanisms remain underexplored.

Mahmood et al. (2024) examined GF, sustainable infrastructure, and green technology innovation in Belt and Road Initiative countries, using SEM to demonstrate that green technology investments supported by adequate financing improve alignment with the SDGs. Their analysis offers partial methodological precedent for the mediation model proposed in the present study, though their scope was confined to infrastructure and did not examine the broader innovation-investment duality captured by IGPs and SIS simultaneously. Saleem et al. (2022), using panel econometrics across Asian economies, showed that accessible GF options significantly advance green R&D and eco-innovation, with positive downstream effects on CO_2 emission reduction and energy efficiency, outcomes corresponding to the EnS dimension examined here. Ozili (2022), in an extensive scoping review, explicitly identified micro-level GF impact and the role of technical enablers as insufficiently studied, reinforcing the rationale for this study's focus on IGPs and SIS as operationalised mediating constructs. Kwilinski et al. (2025) further highlighted that innovation and GF must function in concert for measurable sustainability outcomes to be achieved, a claim this study tests empirically.

2.5 Green Finance, Corporate Environmental Behavior, and Sustainability Outcomes

Recent studies reveal a critical tension between green finance adoption and measurable environmental outcomes, directly addressing whether financial mechanisms produce genuine sustainability improvements or merely facilitate superficial compliance. Duchin, Gao, and Xu (2025) provide sobering evidence from the asset market for pollutive industrial plants, demonstrating that firms divesting pollutive facilities in response to environmental pressures generate no aggregate pollution reduction, as buyer firms face weaker oversight yet sellers benefit through enhanced ESG ratings and reduced compliance costs despite unchanged emissions. This finding underscores how institutional pressures drive observable green finance behaviors without necessarily producing tangible environmental change, reinforcing the necessity of examining organizational mechanisms through which capital converts into actual innovation rather than financial restructuring.

Complementing this, Akey and Appel (2021) demonstrate through quasi-experimental analysis that weakening corporate environmental liability increases toxic emissions by five to nine percent through reduced abatement investment rather than expanded production, illustrating how governance incentives mediate capital deployment into environmental action. The regulatory context proves equally consequential, as Azam, Rafique, Hashmi, and Lau (2026) find that green finance enhances ESG performance more effectively in nations with higher baseline institutional readiness, revealing significant heterogeneity between developed and emerging economies particularly relevant for fragmented regulatory contexts like India. Zhu et al. (2025) extend this understanding temporally, showing green finance reduces ecological footprint significantly but gradually over multi-year periods rather than immediately, with effects compounding when combined with renewable energy policies.

Finally, Shive and Forster (2020) establish that governance quality and managerial incentives rather than ownership structure determine environmental outcomes, reinforcing that organizational capability to convert green capital into sustainability results depends on internal strategic processes. Collectively, these studies validate that green finance produces sustainability outcomes through specific organizational mediators—innovative green projects and sustainable investment strategies—rather than direct effects, positioning the current study's dual-mediation model as addressing the micro-level mechanisms this emerging literature identifies as critical yet under-theorized.

3 Theoretical Framework

This study integrates three complementary theoretical frameworks, with Institutional Theory serving as the primary lens and the Resource-Based View (RBV) and Legitimacy Theory functioning as supporting frameworks that together provide a comprehensive account of the mechanisms under investigation.

Institutional Theory (DiMaggio and Powell, 1983; Scott, 1995) provides the primary explanatory scaffold. It posits that organisations operating within an institutional environment, comprising regulatory mandates, industry norms, and cognitive expectations, are subject to isomorphic pressures that shape their strategic and financial decisions. Applied to the GF context, Institutional

Theory explains why sustainability-oriented sectors in India adopt GF mechanisms: coercive pressures from environmental regulation, mimetic pressures from industry peers adopting green investment norms, and normative pressures from professional networks and sustainability standards collectively drive organisations toward GF adoption. Critically, the theory predicts that GF adoption will cascade into structured innovation (IGPs) and investment behaviour (SIS), as organisations seek to align with prevailing institutional expectations. This provides the theoretical basis for the hypothesised GF → IGP and GF → SIS relationships.

Resource-Based View (Barney, 1991; Wernerfelt, 1984) complements Institutional Theory by explaining the internal organisational dynamics through which GF is converted into sustainability outcomes. RBV posits that sustained competitive advantage derives from the deployment of unique, valuable, and inimitable resources and capabilities. In the green finance context, IGPs represent the deployment of innovation capabilities, proprietary technologies, skilled human capital, and organisational knowledge, that are mobilised through GF and generate environmental and social value. SIS, in turn, represent the strategic resource allocation capabilities that determine how GF is channelled toward sustainability objectives. RBV thus explains why the relationship between GF and sustainability is mediated rather than direct: the conversion of financial resources into sustainability outcomes requires the firm-level capabilities captured by IGPs and SIS.

Legitimacy Theory (Suchman, 1995; Dowling and Pfeffer, 1975) provides the third layer of explanation, addressing the external social dynamics that reinforce GF engagement. Legitimacy Theory holds that organisations pursue actions that are perceived as socially appropriate and aligned with prevailing societal values in order to maintain their social licence to operate. In sustainability-sensitive sectors, particularly renewable energy, environmental consulting, and green finance, GF adoption, innovative green project development, and ESG-aligned investment strategies serve as visible signals of legitimacy to regulators, investors, and communities. This theoretical layer explains the motivation behind SIS in particular, as ESG-integrated investment frameworks are, in part, a legitimacy management strategy that aligns institutional investment behaviour with evolving social expectations around sustainability.

Together, these three theoretical lenses provide an integrated and non-redundant explanatory framework: Institutional Theory explains why organisations adopt GF; RBV explains how GF is converted into sustainability outcomes through IGPs and SIS; and Legitimacy Theory explains the external social reinforcement mechanisms that sustain this behaviour. This multi-theoretic frounding is consistent with recent practice in top sustainability finance research (e.g., Hussain et al., 2024; Mahmood et al., 2024).

4 Problem Statement, Research Gap, and Research Objectives

4.1 Problem Statement and Research Gap

Three specific gaps emerge from the review above. First, while existing research documents the macro-level relationship between GF and sustainability, very few studies have empirically modelled the micro-level organisational pathways, specifically IGPs and SIS as dual mediators, through which green capital produces sustainability outcomes across all three ESG dimensions simultaneously. Second, the existing mediation analyses in this domain are largely confined to single sectors or single mediator models; no study has simultaneously examined both IGPs and SIS as parallel mediators across social, economic, and environmental sustainability within a multi-sector emerging-market sample. Third, the theoretical grounding of empirical GF research remains underdeveloped, with most studies relying on single-theory framings that fail to capture the institutional, resource-based, and legitimacy dimensions of GF behaviour simultaneously. This study addresses all three gaps through a multi-theoretic dual-mediation model tested on multi-sector data from Indian sustainability professionals.

This study examines the direct and intermediate connections between GF and sustainability dimensions, such as ESG areas. The major research objective is to show evidence-based visions for the actual application of GF-driven tools and techniques to encourage innovation and sustainability.

4.2 Main Research Goal

The primary aim of this research is to examine the impact of GF on sustainability outcomes and to evaluate the mediating roles of IGPs and SIS in refining environmental, social, and economic (ESG) sustainability.

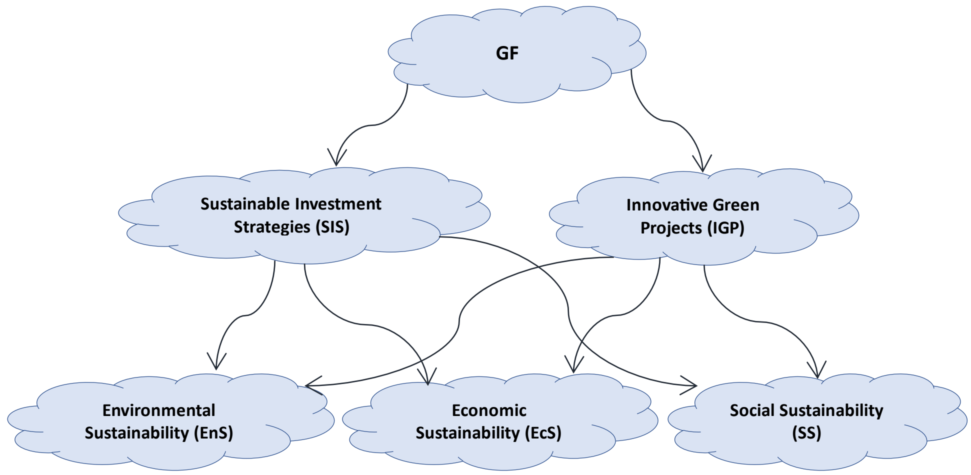

Figure 1: Research Model

4.3 *Research Objectives*

- Determine the direct correlation between GF and IGP.
- Determine the direct influence of GF on SIS.
- Examine the influence of SIS and IGPs on ESG sustainability.
- Determine the mediating effect of IGPs and SIS in the association of GF with three sustainability-driven pillars.

4.4 Hypothesis Development

The discussion above leads to the following hypotheses.

❖ Direct Relationships

- ✓ *Ho1: GF has a positive and significant relationship with IGPs.*
- ✓ *Ho2: GF has a positive and significant relationship with SIS.*

❖ Impact of Mediators on Sustainability Dimensions

- ✓ *Ho3a: IGPs have a positive and significant connection with SS.*
- ✓ *Ho3b: IGPs have a positive and significant connection with EcS.*
- ✓ *Ho3c: IGPs have a positive and significant connection with EnS.*
- ✓ *Ho4a: SIS have a positive and significant connection with SS.*
- ✓ *Ho4b: SIS have a significant positive relationship with EcS.*
- ✓ *Ho4c: SIS have a significant positive relationship with EnS.*

- Mediating Effects
  - ✓ *Ho5a: IGPs mediate the relationship between GF and SS.*
  - ✓ *Ho5b: IGPs mediate the relationship between GF and EcS.*
  - ✓ *Ho5c: IGPs mediate the relationship between GF and EnS.*
  - ✓ *Ho6a: SIS mediate the relationship between GF and SS.*
  - ✓ *Ho6b: SIS mediate the relationship between GF and EcS.*
  - ✓ *Ho6c: SIS mediate the relationship between GF and EnS.*

5 Research Methodology

5.1 Research Design

This study adopts a quantitative and explanatory research design. A quantitative approach is appropriate given that the study seeks to test theoretically derived hypotheses about the directional relationships between GF, IGPs, SIS, and sustainability outcomes using numerically measurable perceptual data collected from domain experts. An explanatory design is employed because the study is concerned not merely with identifying associations but with elucidating the causal mechanisms, specifically the mediating roles of IGPs and SIS, through which GF influences social, economic, and environmental sustainability (Creswell, 2014). This design is consistent with prior studies employing mediation analysis in the GF and sustainability literature (Mahmood et al., 2024; Hussain et al., 2024).

5.2 Sampling

A purposive sampling strategy was adopted to target professionals with direct, domain-specific experience in sustainability-oriented sectors. This approach is justified by the need for respondents who possess sufficient practical and contextual knowledge of GF mechanisms to provide valid perceptual assessments, and is consistent with expert-sampling conventions in the GF literature (Kwilinski et al., 2025; Ma and Chang, 2023).

Usable responses were collected from 138 professionals across five sectors in India: renewable energy firms (n = 36, 26%), environmental consultancies (n = 30, 22%), infrastructure including transportation (n = 32, 23%), technology-based startups (n = 24, 17%), and green finance firms (n = 16, 12%). Respondents occupied roles including project manager, sustainability analyst, technical executive, and financial consultant, ensuring cross-functional coverage within each sector. The regional distribution comprised Northern India (44%), Southern India (31%), and Western India (25%).

With respect to sample adequacy for CB-SEM, Kline (2016) recommends a minimum ratio of 10 observations per free parameter. The measurement model in this study contains 27 observed indicators across six latent constructs, yielding an observations-to-indicators ratio of approximately 5.1:1 (138/27). While this falls below the ideal 10:1 ratio, it meets the minimum threshold of 5:1 commonly cited in the literature for models with strong indicator loadings (Hair et al., 2019). Given that all loadings exceed 0.75 (see Table 2), this sample size is considered adequate for stable parameter estimation. A sensitivity analysis using G*Power confirmed that the sample achieves statistical power of approximately 0.82 for detecting medium effect sizes ($f^2 = 0.15$) at $\alpha = 0.05$.

5.3 Data Collection Instrument

Data were collected using a structured, self-administered questionnaire distributed both online and in person. The instrument comprised items measuring six constructs: GF (5 items), IGPs (4 items), SIS (5 items), social sustainability, SS (5 items), economic sustainability, EcS (4 items), and environmental sustainability, EnS (4 items), totalling 27 items.

Since no single existing instrument fully captures the multi-dimensional constructs of IGPs and SIS as operationalised in this study, all items were developed specifically for this research. Scale development followed a systematic process consistent with established guidelines (DeVellis, 2017). First, an initial item pool was generated by the research team through a systematic review of the GF, innovation, and sustainability literatures. Second, the item pool was reviewed by a panel of seven domain experts, comprising academics with expertise in green finance, sustainability management, and quantitative methods, alongside senior practitioners from the renewable energy and environmental consulting sectors, who assessed each item for content validity, clarity, and relevance to the Indian context. Expert feedback was used to refine item wording, remove redundant items, and ensure that each construct's items collectively capture its intended theoretical domain. All final items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

5.4 Measures of Reliability and Validity

To confirm the reliability of the instrument, Cronbach's alpha was calculated for all the scale-based constructs. All items attained a Cronbach's alpha of 0.79, indicating substantial internal consistency. All components in the questionnaire were measured using standardized scales.

5.5 Construct Validity

Convergent validity was determined through the average variance extracted (AVE) and CR. Discriminant validity was established using specified criteria.

5.6 Analysis Techniques and Statistical Tools

SEM was applied to test the proposed model and quantify the direct and indirect effects of GF on sustainability through the mediating functions of IGP and SIS.

The bootstrapping approach was applied to test the mediating effects of IGP and SIS on the relationship between GF and the *three sustainability criteria.*

Data analysis and reliability testing were performed using SPSS. AMOS was employed for the SEM and bootstrapping analysis to facilitate the modeling and validation.

6 Data and Analysis

Table 1 presents the data relating to respondents' demographic profiles.

Table 1: Respondents' Demographic Profile

Category	Sub-Category	Frequency (F) Sample Size (n = 138)	(%) Percentages
Gender-Wise	Female (F)	39	28
	Male (M)	99	72
Region-Wise	Northern India	60	44
	Southern India	43	31
	Western India	35	25
Job Profile-Wise	Project Managers	31	22
	Sustainability Analysts	36	26
	Technical Executives	34	25
	Financial Consultants	37	27

Education Level-Wise	Diploma Holders	6	4
	Bachelor's Degree	78	57
	Postgraduate Degrees	54	39
Working Sector	Renewable Energy Firms	36	26
	Environmental Consultancies	30	22
	Infrastructure (incl. transportation)	32	23
	Tech-based Startups	24	17
	Green Finance Firms	16	12

Note: Author Compiled Output.

In Table 1, the demographic analysis of the 138 responses shows that the majority were male (72%), with only 28% female. The maximum number of respondents were in Northern India (44%), followed by Southern India (31 %), and Western India (25%). The sample has significant diversification across job categories, with technical executives being 25% of respondents and project managers accounting for just 22% of the total. The majority of respondents held graduate or postgraduate degrees (96%), which indicates a highly educated demographic profile of respondents. The employment parameters varied, with renewable energy-driven companies (26%), whereas infrastructure (including transportation-based companies) (23%) had the peak share among respondents.

Table 2: Analysis: Reliability and Validity Criterion

Sample (n = 138)

Construct	Item	Loadings	VIF	Cronbach's Alpha	CR	AVE
Green Financing *(IV)*	G.F1	0.782	2.110	0.814	0.879	0.640
	G.F2	0.844	2.874			
	G.F3	0.801	2.532			
	G.F4	0.768	2.006			
	G.F5	0.790	1.823			

Innovative Green Projects *(MV)*	I.GP1	0.822	2.177	0.835	0.887	0.615
	I.GP2	0.764	2.409			
	I.GP3	0.833	1.964			
	I.GP4	0.790	1.879			
Sustainable Investment Strategies *(MV)*	S.IS1	0.794	2.088	0.842	0.895	0.631
	S.IS2	0.768	2.195			
	S.IS3	0.814	1.934			
	S.IS4	0.784	1.813			
	S.IS5	0.756	1.679			
Social Sustainability *(DV)*	S.S1	0.743	1.545	0.793	0.866	0.618
	S.S2	0.828	2.055			
	S.S3	0.825	2.112			
	S.S4	0.783	2.011			
	S.S5	0.800	1.720			
Economic Sustainability *(DV)*	E.S1	0.781	1.545	0.849	0.887	0.567
	E.S2	0.841	2.055			
	E.S3	0.888	2.112			
	E.S4	0.809	2.114			
Environmental Sustainability *(DV)*	E.N1	0.782	1.642	0.884	0.915	0.685
	E.N2	0.830	1.831			
	E.N3	0.767	1.551			
	E.N4	0.763	1.521			
Note: IV = Independent_Variable; MV = Mediating_Variable; DV = Dependent_Variable; CR = Composite_ Reliability; AVE = Average Variance_Extracted						

Note: Author Compiled Output.

Table 2 presents the results of the measurement model assessment, reporting indicator loadings, variance inflation factors (VIF), Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) for all six constructs. All indicator loadings exceed the recommended threshold of 0.70 (Hair et al., 2019), ranging from 0.743 (SS1) to 0.888 (ES3), confirming that each item shares sufficient variance with its parent construct. VIF values across all indicators remain below 3.5, well within the conservative threshold of 5.0 recommended by Hair et al. (2019), indicating that multicollinearity does not represent a concern within any construct's item set.

Internal consistency reliability is satisfactory across all constructs. Cronbach's alpha values range from 0.793 (SS) to 0.884 (EnS), all exceeding the minimum threshold of 0.70 (Nunnally, 1978). Composite reliability values range from 0.866 (SS) to 0.915 (EnS), all surpassing the threshold of 0.70, and are uniformly higher than their corresponding Cronbach's alpha values, a pattern expected under reflective measurement where indicators are assumed to be interchangeable manifestations of the underlying latent construct (Hair et al., 2019).

Convergent validity is established through the AVE criterion. AVE values range from 0.567 (EcS) to 0.685 (EnS). All constructs meet or exceed the threshold of 0.50 recommended by Fornell and Larcker (1981), indicating that each construct explains more than half of the variance in its indicators on average. The lowest AVE, observed for EcS (0.567), nonetheless satisfies this threshold and is further supported by the construct's strong CR value of 0.887, consistent with the guidance that high CR can partially compensate for AVE values close to the threshold boundary (Fornell and Larcker, 1981).

Taken together, the measurement model results confirm that all six constructs demonstrate adequate reliability and convergent validity, providing a sound basis for proceeding to structural model estimation and hypothesis testing.

Table 3: Discriminant Validity

Construct	GF	IGP	SIS	SS	ES	EN
Green Finance (GF)	0.800					
Innovative Green Projects (IGP)	0.644	0.784				
Sustainable Investment Strategies (SIS)	0.618	0.659	0.794			
Social Sustainability (SS)	0.603	0.621	0.648	0.786		
Economic Sustainability (ES)	0.589	0.600	0.610	0.677	0.752	
Environmental Sustainability (EN)	0.610	0.633	0.658	0.671	0.685	0.827

Note: Diagonal values (in bold) are the square roots of the AVEs for each construct. Off-diagonal values are the correlation of the coefficients between constructs.

Note: Author Compiled Output.

In Table 3, which presents discriminant validity, the bold diagonal values represent the square roots of the AVE, which are greater than their corresponding inter-construct correlations. Based on the above analysis, discriminant validity is relatively robust. This result indicates that each concept is diverse and is evaluated differently. The measurement method displays strong validity in distinguishing among GF, IGPs, SIS, and all three major characteristics of sustainability.

Table 4: Direct Relationships (Hypothesis Testing)

Hypothesis	Relationship	Path Coefficient (β)	Standard Error (SE)	CR (t-value)	p-value	Result
H01	GF → IGP	0.612	0.051	11.91	0.000	Supported
H02	GF → SIS	0.579	0.048	12.06	0.000	Supported

Note: Author Compiled Output.

Table 4 shows that GF has a significant and valuable impact on both IGPs and SIS, as presented by robust path of coefficient and its highly significant p-values (p = 0.000). The high CR (t-values) corroborate the strength of such direct relationships. This discloses the important roles of GF in advancing to the innovation and environmental initiatives.

Table 5: Impact of Mediators on Sustainability Dimensions (Hypothesis Testing)

Hypothesis	Relationship	Path Coefficient (β)	Standard_ Error (SE)	CR (t-value)	p-value	Result
H03a	IGP → SS	0.484	0.057	8.49	0.000	Supported
H03b	IGP → EcS	0.467	0.062	7.53	0.000	Supported
H03c	IGP → EnS	0.521	0.059	8.83	0.000	Supported
H04a	SIS → SS	0.456	0.061	7.48	0.000	Supported
H04b	SIS → EcS	0.439	0.058	7.57	0.000	Supported
H04c	SIS → EnS	0.498	0.063	7.90	0.000	Supported

Note: Author Compiled Output.

In Table 5 both IGP and SIS have a substantial positive influence on SS, EcS, and EnS, with all path coefficients (β) being robust and statistically significant (p = 0.000). Elevated CR (t-values) also confirmed the strength of these associations. This result indicates the essential mediating role of IGPs and SIS in promoting sustainability.

Table 6: Mediating Effects via Bootstrapping methods

Hypothesis	Mediation Path	Indirect Effects (β)	Boot Strapped SE	95% CI (Lower Vs Upper Limit)	P-value	Type of Mediation
H05a	GF → IGP → SS	0.296	0.045	(0.221, 0.379)	0.000	Partial Mediation
H05b	GF → IGP → EcS	0.286	0.048	(0.201, 0.369)	0.000	Partial Mediation
H05c	GF → IGP → EnS	0.319	0.047	(0.239, 0.408)	0.000	Partial Mediation
H06a	GF → SIS → SS	0.264	0.046	(0.184, 0.348)	0.000	Partial Mediation
H06b	GF → SIS → EcS	0.254	0.049	(0.173, 0.339)	0.000	Partial Mediation
H06c	GF → SIS → EnS	0.288	0.051	(0.207, 0.375)	0.000	Partial Mediation
All direct connections exhibit statistical significance (p < 0.001). All mediators (IGPs and SIS) have a substantial impact on all three dimensions of sustainability (SS, EcS, EnS). Mediation analyses also revealed partial mediation effects, indicating the existence of both direct and indirect influences of GF on sustainability elements.						

Note: Author Compiled Output.

Table 6 displays hypothesis testing results using the bootstrapping methods and validates the strong indirect influences of GF on ESG via the mediators of IGPs and SIS. All indirect effects have p-values of 0.000, hence the results confirm a positive statistical significance. The 95% confidence intervals eliminate zero, emphasizing the rationality of the mediation effects. Outcomes reveal that partial mediation, representing that GF impacts to the parameters of sustainability both directly and indirectly via IGPs and SIS. These findings demonstrate the vital status of innovation and strategic investments in improving sustainability results.

7 Results

This study examined the influence of green finance (GF) on three dimensions of sustainability, social (SS), economic (EcS), and environmental (EnS), through the mediating roles of Innovative Green Projects (IGPs) and Sustainable Investment Strategies (SIS). The structural model strongly confirms that the hypothesised relationships are consistent with the observed covariance structure of the data. All twelve hypothesised relationships were supported, and bootstrapped mediation analysis confirmed partial mediation across all six indirect pathways. The following discussion interprets these findings through the integrated theoretical framework of Institutional Theory, the Resource-Based View (RBV), and Legitimacy Theory, and situates them within the prior empirical literature.

7.1 Green Finance and Innovative Green Projects (H1)

The finding that GF exerts a significant positive effect on IGPs ($\beta = 0.612$, $p < 0.001$) is consistent with the institutional logic that coercive and normative pressures within sustainability-sensitive sectors drive organisations to convert green financial resources into structured innovation activities. From an Institutional Theory perspective (DiMaggio & Powell, 1983), organisations operating in the renewable energy, environmental consulting, and green finance sectors face regulatory mandates and professional norms that require them to invest in innovative green initiatives, not merely desirable but institutionally expected. GF provides the capital mechanism through which these pressures operationalise, transforming institutional obligation into tangible innovation output.

This finding aligns with Ahmed et al. (2024), who established that GF functions simultaneously as a capital source and a strategic instrument for sustainable innovation, and with Ma and Chang (2023), whose cross-national panel analysis demonstrated that robust GF mechanisms are associated with significantly higher green patent applications and technological diffusion. The relatively large path coefficient in the present study ($\beta = 0.612$) further suggests that within the Indian context, where innovation financing constraints are pronounced (Jha & Bakhshi, 2019), GF plays an especially critical enabling role, providing the resource base that RBV theory (Barney, 1991) identifies as the prerequisite for developing valuable and inimitable sustainability capabilities.

7.2 Green Finance and Sustainable Investment Strategies (H2)

GF also demonstrated a significant positive effect on SIS ($\beta = 0.579$, $p < 0.001$), indicating that access to green financial instruments encourages organisations to formalise ESG criteria within their investment decision-making frameworks. This relationship is theoretically coherent from both an institutional and legitimacy perspective. Institutionally, the adoption of SIS reflects mimetic isomorphism (DiMaggio & Powell, 1983) as GF instruments such as green bonds and sustainability-linked loans proliferate across the market, organisations adopt ESG-integrated investment frameworks to align with emerging industry norms. From a Legitimacy Theory standpoint (Suchman, 1995), SIS adoption also functions as a strategic legitimacy signal: by demonstrating that investment decisions are systematically screened for environmental and social criteria, organisations affirm their alignment with the values of regulators, institutional investors, and civil society.

These findings are consistent with Falcone (2020), who showed that green financial instruments bridge the gap between regulatory frameworks and market investment behaviour, and with Hussain et al. (2024), who demonstrated that financial institutions that embed GF into their strategic planning consistently outperform peers on ESG indicators. The slightly lower path coefficient for GF → SIS compared to GF → IGPs (0.579 vs. 0.612) may reflect the fact that formalising investment strategy frameworks requires broader organisational change, involving governance structures, reporting systems, and stakeholder engagement processes, than initiating discrete innovation projects, a nuance consistent with RBV's emphasis on the cumulative nature of strategic capability development (Barney, 1991).

7.3 IGPs and Sustainability Outcomes (H3a, H3b, H3c)

IGPs demonstrated significant positive effects on all three sustainability dimensions: SS ($\beta = 0.484$, $p < 0.001$), EcS ($\beta = 0.467$, $p < 0.001$), and EnS ($\beta = 0.521$, $p < 0.001$). The relatively stronger effect on EnS compared to SS and EcS is theoretically meaningful. IGPs, by definition centred on ecological innovation, clean technology deployment, and resource efficiency, most directly address environmental outcomes, producing measurable reductions in carbon emissions, improvements in energy efficiency, and advances in sustainable resource management. This is consistent with Anas et al. (2024), who found that green technology innovation is a decisive factor in improving environmental sustainability in rapidly industrialising economies, and with Feng

(2022), who demonstrated that GF-supported renewable energy initiatives generate direct environmental gains.

The significant effect of IGPs on SS (β = 0.484) reflects the social co-benefits of green innovation, job creation in emerging clean industries, community participation in renewable energy projects, and improved access to sustainable infrastructure, outcomes documented by Ahmed et al. (2024) in their analysis of GF's social innovation effects. The effect on EcS (β = 0.467), while the smallest of the three, is consistent with the expectation that economic sustainability gains from innovation projects materialise over longer time horizons, as cost efficiencies, market advantages, and productivity improvements accumulate progressively rather than immediately (Kwilinski et al., 2025). From an RBV perspective, these findings confirm that IGPs represent genuine strategic resources, converting green financial capital into multi-dimensional sustainability value that is both valuable and difficult for competitors to replicate rapidly.

7.4 SIS and Sustainability Outcomes (H4a, H4b, H4c)

SIS similarly demonstrated significant positive effects on SS ($\beta = 0.456$, $p < 0.001$), EcS ($\beta = 0.439$, $p < 0.001$), and EnS ($\beta = 0.498$, $p < 0.001$). The pattern of effects across sustainability dimensions mirrors that observed for IGPs, with EnS receiving the strongest effect and EcS the weakest, a finding that reinforces the interpretation that ESG-integrated investment strategies most directly generate environmental outcomes. In contrast, economic sustainability gains accumulate more gradually. This ordering is consistent with Saleem et al. (2022), who demonstrated that accessible GF options significantly advance green R&D and eco-innovation with positive downstream effects on CO_2 reduction and energy efficiency, and with Zhang et al. (2022), who found that ESG-aligned banking practices generate measurable environmental performance improvements.

Comparing SIS and IGP effects, IGPs consistently produced slightly larger effects across all three sustainability dimensions. This differential is theoretically interpretable through Legitimacy Theory (Suchman, 1995). While SIS represent important legitimacy management strategies that align investment behaviour with sustainability norms, they operate primarily at the level of capital allocation decisions. In contrast, IGPs involve the active deployment of innovation capabilities that directly intervene in environmental and social systems. The result suggests that strategic investment alignment is necessary but not sufficient, it must be complemented by active innovation deployment to maximise sustainability impact, a finding with direct implications for how GF frameworks should be designed and evaluated.

7.5 Mediation Analysis: IGPs and SIS as Partial Mediators (H5a–H5c, H6a–H6c)

The bootstrapped mediation analysis confirmed that both IGPs and SIS partially mediate the relationship between GF and all three sustainability dimensions. The indirect effects through IGPs ranged from $\beta = 0.286$ (GF → IGP → EcS) to $\beta = 0.319$ (GF → IGP → EnS), while indirect effects through SIS ranged from $\beta = 0.254$ (GF → SIS → EcS) to $\beta = 0.288$ (GF → SIS → EnS). All confidence intervals excluded zero, confirming statistical significance. Critically, the direct effects of GF on SS, EcS, and EnS, estimated simultaneously with the indirect paths, remained significant, establishing partial rather than full mediation.

Partial mediation carries an important substantive interpretation: GF contributes to sustainability outcomes through both the innovation and investment channels captured by IGPs and SIS, as well as through additional direct pathways not fully captured by these two mediators. These residual direct effects likely reflect other mechanisms through which GF influences sustainability, including reputational effects, signalling to external stakeholders, and macroeconomic spillovers from green capital flows, that fall outside the scope of the present model but represent productive directions for future research. This interpretation is consistent with Mahmood et al. (2024), who similarly found that GF's sustainability effects operate through multiple simultaneous channels, and with Ozili (2022), who identified the multiplicity of GF impact pathways as a critical underexplored area in the literature.

From a theoretical standpoint, partial mediation confirms the integrated explanatory value of the three-theory framework. The direct GF → sustainability path reflects the macro-institutional pressure effect theorised by Institutional Theory, GF adoption, driven by coercive and normative forces, produces direct sustainability improvements through regulatory compliance and market signalling. The mediated paths reflect the RBV mechanism: green capital converted into firm-level innovation and investment capabilities (IGPs and SIS) yields additional sustainability gains beyond those generated by GF adoption alone. Moreover, the persistence of both pathways simultaneously is consistent with Legitimacy Theory's prediction that organisations maintain GF engagement not only to satisfy institutional requirements but also to build and sustain stakeholder legitimacy through demonstrated sustainability performance actively.

7.6 Sectoral and Demographic Insights

The demographic profile of the sample offers additional interpretive depth. The renewable energy sector (26%) and infrastructure sector (23%) together accounted for nearly half the sample. They showed the strongest alignment with sustainability objectives, a finding consistent with the theoretical expectation that sectors subject to the most intensive coercive institutional pressures (regulatory requirements, international climate commitments, investor ESG mandates) will exhibit the strongest GF-sustainability relationships (DiMaggio & Powell, 1983). The high educational profile of respondents (96% holding graduate or postgraduate degrees) suggests that the perceptual assessments underpinning the model reflect informed, domain-specific expertise rather than general public opinion, strengthening the construct validity of the findings. The gender imbalance in the sample (72% male) reflects documented structural inequalities in sustainability-oriented professional sectors in India. It represents a limitation that future studies should address through targeted sampling strategies.

8 Conclusion

This study set out to examine the pathways through which green finance (GF) produces measurable sustainability outcomes, proposing Innovative Green Projects (IGPs) and Sustainable Investment Strategies (SIS) as the critical mediating mechanisms. The findings, derived from CB-SEM analysis of data collected from 138 multi-sector sustainability professionals in India, provide robust empirical support for all twelve hypothesised relationships. GF exerts significant positive effects on both IGPs and SIS; both mediators positively influence all three sustainability dimensions, and bootstrapped mediation analysis confirms that IGPs and SIS partially mediate the GF–sustainability relationship. The structural model demonstrates acceptable fit, and all constructs satisfied established thresholds for reliability and validity.

This study makes three distinct theoretical contributions to the GF and sustainability literature. First, it advances a multi-theoretic framework, integrating Institutional Theory as the primary explanatory lens with RBV and Legitimacy Theory as supporting frameworks, that provides a more complete and coherent account of GF behaviour than any single-theory model can offer.

Institutional Theory explains why organisations adopt GF under regulatory and normative pressure; RBV explains how green capital is converted into sustainability capabilities through IGPs and SIS; and Legitimacy Theory explains the external social reinforcement mechanisms that sustain GF engagement over time. Together, these three lenses capture the institutional, resource, and relational dimensions of GF behaviour in an integrated manner that prior studies have not achieved.

Second, the study contributes the first empirical test of a dual-mediator model, with IGPs and SIS operating as parallel mediating mechanisms, across all three ESG sustainability dimensions simultaneously. Prior mediation analyses in this domain (e.g., Mahmood et al., 2024) examined single mediators within single-sector contexts; the present study demonstrates that innovation and investment channels operate concurrently and produce differentiated effects across sustainability dimensions, with environmental sustainability receiving the strongest mediated effects in both cases.

Third, the finding of partial rather than full mediation advances theoretical understanding by establishing that GF contributes to sustainability both through the organisational channels captured by IGPs and SIS, and through additional direct pathways that remain to be theorised and tested. This finding opens a productive agenda for future theoretical development around the full range of mechanisms through which GF produces sustainability outcomes.

Furthermore, the findings have specific actionable implications for three stakeholder groups.

For policymakers and regulators, the partial mediation finding indicates that GF policy frameworks should be designed not merely to expand the volume of green capital, but to ensure that capital flows through innovation and strategic investment channels. Regulatory incentives, including tax benefits for green R&D, mandated ESG reporting requirements, and preferential financing for certified innovative green projects, can strengthen the IGP and SIS pathways and thereby maximise the sustainability return on every unit of green capital deployed. The Indian policy context, where GF adoption remains uneven across sectors and regions (Jha & Bakhshi, 2019), would particularly benefit from targeted institutional interventions that reduce the barriers to IGP development in infrastructure and technology-based startup sectors, which showed the weakest GF-sustainability alignment in this sample.

For institutional investors and green finance practitioners, the finding that SIS effects on sustainability are consistently slightly weaker than IGP effects suggests that ESG-integrated investment strategies are most impactful when they explicitly prioritise capital allocation toward innovation-active organisations and projects. Investment frameworks that reward not only ESG disclosure but also active innovation deployment, measured by green patent activity, clean technology adoption rates, and certified environmental impact, are likely to yield stronger sustainability outcomes than disclosure-only ESG screening approaches.

For sustainability managers and corporate leaders, the findings highlight the strategic value of developing internal IGP capabilities as a complement to GF access. Organisations that treat GF as a passive funding mechanism without investing in the innovation and project management capabilities needed to convert that capital into IGPs will capture only the direct GF → sustainability effect, forgoing the additional sustainability gains generated through the mediated pathway. Leadership investment in sustainability-oriented human capital, cross-functional green project teams, and systematic ESG performance tracking are the organisational enablers through which GF is most effectively converted into multi-dimensional sustainability value.

9 Limitations and Future Research

This study has four limitations that future research should address. First, the cross-sectional design precludes causal inference; the hypothesised relationships are theoretically grounded and statistically supported, but longitudinal data would be necessary to establish temporal precedence and rule out reverse causality. Future studies employing panel designs or longitudinal surveys would strengthen the causal claims of the mediation model. Second, the sample, while professionally diverse, is geographically incomplete, Eastern India is underrepresented, and it skews heavily male (72%). Future studies should employ stratified sampling strategies to ensure fuller geographic and demographic representativeness. Third, as all constructs were measured using newly developed scales administered to a single source at a single point in time, common method bias remains a residual concern despite procedural and statistical remedies. Future research employing multi-source or longitudinal data collection designs would mitigate this limitation. Fourth, the model examines IGPs and SIS as the sole mediating mechanisms; as the partial mediation finding indicates, additional pathways exist through which GF directly influences sustainability outcomes. Future research should explore candidate mechanisms, including reputational effects, macroeconomic GF spillovers, and supply chain sustainability pressures, that may account for the residual direct effect.

Green finance is not merely a financial category, it is an institutional, strategic, and social phenomenon that operates through multiple simultaneous pathways to produce sustainability outcomes. This study demonstrates that the impact of GF on social, economic, and environmental sustainability is meaningfully amplified when green capital flows through innovation-oriented projects and ESG-integrated investment strategies, and that these pathways are theoretically explicable through the combined logic of institutional pressure, resource conversion, and legitimacy management. As green finance markets continue to deepen globally and as emerging economies like India assume a more central role in the sustainability transition, understanding these mechanisms with empirical precision becomes not merely an academic exercise but a practical necessity. This study provides a foundation for that understanding and charts a clear agenda for future research.

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