# Green Finance and Sustainable Development: A Systematic Review of Mechanisms, Outcomes, and Policy Gaps

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**Abstract**

Green finance has emerged as a central policy and market mechanism for redirecting capital toward low-carbon, resource-efficient, and socially inclusive development pathways, yet evidence on which mechanisms actually translate into measurable sustainability outcomes remains fragmented. This study systematically examines the relationships among policy and regulatory support, disclosure and transparency infrastructure, the availability of green financial instruments, institutional capacity, and perceived risk barriers in shaping green finance adoption, and in turn, perceived progress toward Sustainable Development Goal (SDG)-aligned outcomes. A cross-sectional survey was administered to a global sample of 410 respondents drawn from commercial banks, institutional investors, non-financial corporates, and green/climate funds or fintech firms across five global regions. Validated multi-item Likert scales were used to measure all constructs, and data were analyzed using descriptive statistics, Pearson correlation, hierarchical ordinary least squares (OLS) regression, mediation analysis, and one-way analysis of variance (ANOVA).

All measurement scales demonstrated acceptable to good internal consistency (Cronbach's alpha ranging from 0.831 to 0.891). The regression model explained approximately 49.8% of the variance in green finance adoption ($R^2 = 0.498$, $F(5, 404) = 80.20$, $p < 0.001$), with the availability of green financial instruments ($\beta = 0.320$, $p < 0.001$) and policy and regulatory support ($\beta = 0.312$, $p < 0.001$) emerging as the strongest positive predictors, while perceived risk and informational barriers exerted a significant negative effect ($\beta = -0.155$, $p < 0.001$). Green finance adoption, in turn, significantly predicted SDG-aligned performance outcomes ($\beta = 0.412$, $p < 0.001$), accounting for 35.3% of outcome variance. Mediation analysis confirmed that green finance adoption substantially mediated the relationship between policy support and sustainability outcomes, accounting for approximately 70.9% of the total effect (Sobel $z = 8.26$, $p < 0.001$). No statistically significant differences in adoption were found across firm types ($F = 2.16$, $p = 0.092$) or world regions ($F = 0.86$, $p = 0.486$), suggesting that the structural drivers of green finance adoption operate with notable consistency across institutional and geographic contexts, even as absolute levels of adoption remain moderate worldwide ($M = 2.99$, $SD = 0.87$, on a 5-point scale).

These findings indicate that green finance functions as a critical transmission mechanism linking enabling policy environments to tangible sustainability performance, but that persistent gaps in instrument availability, disclosure infrastructure, and risk-related uncertainty continue to constrain its full potential. The study concludes with a discussion of policy gaps and offers targeted recommendations for regulators, financial institutions, and standard-setting bodies seeking to scale green finance as a credible instrument of sustainable development.

**Keywords:** green finance; sustainable development; ESG disclosure; climate finance policy; SDG performance; institutional capacity; mediation analysis

## 1. Introduction

Climate change, biodiversity loss, and resource scarcity have placed unprecedented pressure on the global financial system to redirect capital away from carbon-intensive activities and toward investments that are environmentally sustainable and socially inclusive. Green finance, broadly defined as financial products, services, and capital flows that explicitly incorporate environmental criteria into investment, lending, and risk-management decisions, has been positioned by international bodies, national regulators, and private financial institutions as one of the principal

mechanisms through which the Sustainable Development Goals (SDGs) and the Paris Agreement's climate targets can be financed at scale.

Despite a rapid proliferation of green bonds, sustainability-linked loans, green credit guidelines, climate risk disclosure frameworks, and dedicated green investment funds over the past decade, the empirical literature linking these mechanisms to verifiable sustainable development outcomes remains uneven. Much of the existing scholarship is either macro-level and country-specific, relying on secondary financial market data, or conceptual and policy-oriented, offering limited firm-level or investor-level evidence on how the mechanisms of green finance actually operate from the perspective of the institutions implementing them. This creates a critical gap: policymakers and financial regulators continue to design green finance frameworks without a clear, empirically grounded understanding of which specific levers, such as regulatory support, disclosure infrastructure, financial instrument availability, or institutional capacity, most strongly drive adoption, and which barriers most significantly constrain it.

This study addresses that gap through a systematic, survey-based investigation of green finance mechanisms and their relationship to sustainable development outcomes, drawing on a global cross-sectional sample of 410 respondents from financial and non-financial institutions. The study is guided by three central objectives: first, to identify and empirically validate the principal mechanisms through which green finance is adopted and operationalized across institutional contexts; second, to quantify the relationship between green finance adoption and perceived SDG-aligned performance outcomes, including the mediating role of adoption itself; and third, to identify persistent policy gaps that limit the scaling of green finance, particularly with respect to disclosure standardization, instrument accessibility, and institutional readiness.

### 1.1 Statement of the Problem

Green finance markets have grown substantially in nominal terms, yet adoption remains uneven across institutional types, regions, and firm sizes, and there is limited consensus on whether observed growth in green financial instruments corresponds to proportionate improvements in real sustainability performance, or whether it reflects compliance-driven, symbolic, or 'greenwashed' behavior. Without empirical clarity on the mechanisms that meaningfully connect green finance to outcomes, policy interventions risk being misallocated, regulatory frameworks risk being either too lax to drive change or too burdensome to encourage participation, and capital risks continuing to flow disproportionately to a small subset of well-resourced institutions and geographies.

### 1.2 Research Objectives

1. To examine the influence of policy and regulatory support, disclosure and transparency infrastructure, green financial instrument availability, and institutional capacity on the adoption of green finance practices among financial and non-financial institutions.
2. To assess the effect of perceived risk and informational barriers on green finance adoption.
3. To evaluate the relationship between green finance adoption and perceived Sustainable Development Goal (SDG)-aligned performance outcomes.
4. To test whether green finance adoption mediates the relationship between policy support and sustainability performance outcomes.
5. To examine whether green finance adoption differs significantly across firm types, firm sizes, and world regions, in order to identify structural policy gaps.

### 1.3 Research Questions

- RQ1: What is the relative influence of policy support, disclosure infrastructure, instrument availability, institutional capacity, and perceived risk barriers on green finance adoption?
- RQ2: To what extent does green finance adoption predict perceived progress toward SDG-aligned sustainability outcomes?
- RQ3: Does green finance adoption mediate the relationship between policy support and sustainability performance?
- RQ4: Do patterns of green finance adoption vary significantly by institutional type or geographic region, and if not, what does this imply about the universality versus context-specificity of green finance policy gaps?

### 1.4 Significance of the Study

This study contributes to the green finance literature in three ways. First, it provides firm- and investor-level empirical evidence, complementing the predominantly macro-level and bibliometric literature on green finance and sustainable development. Second, it operationalizes and validates a multi-construct measurement model spanning regulatory, informational, instrument-level, and institutional dimensions of green finance, offering a reusable framework for future comparative research. Third, by explicitly testing mediation and group-difference effects, the study moves beyond descriptive mapping of green finance mechanisms toward a more rigorous, policy-relevant explanatory account of how and for whom green finance translates into sustainable development outcomes.

## 2. Literature Review

### 2.1 Conceptualizing Green Finance

Green finance is generally understood as the set of financial instruments, institutions, and policies designed specifically to support investments that generate environmental co-benefits, including climate change mitigation and adaptation, biodiversity conservation, and pollution control, as part of broader sustainable development objectives. The concept encompasses a heterogeneous set of mechanisms, including green bonds, green credit and lending guidelines, sustainability-linked loans, carbon markets, green insurance products, environmental risk disclosure regimes, and dedicated climate or green investment funds. While definitions vary across jurisdictions and standard-setting bodies, there is broad consensus that green finance is distinguished from conventional finance primarily by the explicit integration of environmental criteria into capital allocation decisions, whether through regulatory mandate, voluntary commitment, or market-driven demand for sustainability-linked returns.

### 2.2 Theoretical Foundations

Three theoretical perspectives are commonly invoked to explain green finance adoption and its developmental effects. Stakeholder theory suggests that financial institutions and corporates adopt green finance practices in response to pressure from a broadening set of stakeholders, including regulators, investors, civil society, and customers, who increasingly demand environmental accountability. Institutional theory, by contrast, emphasizes that adoption is driven by coercive, normative, and mimetic pressures arising from regulatory mandates, professional norms, and peer-firm behavior, helping to explain why green finance practices often diffuse unevenly across sectors and regions depending on the strength of local institutional pressures. Finally, the natural resource-based view and related capability-based perspectives argue that green finance adoption depends on a firm's accumulated technical, informational, and organizational capacity to identify, price, and manage environmental risk, suggesting that institutional capacity functions as both an enabler of, and a constraint on, green finance uptake. This study draws on an integrative framework combining elements of all three perspectives, treating policy and regulatory support as a coercive and normative driver, disclosure and transparency infrastructure as both a normative and capability-related mechanism, instrument availability as a market-structural enabler, and institutional capacity and perceived risk as firm-level capability and uncertainty factors, respectively.

### 2.3 Mechanisms of Green Finance: Empirical Evidence

#### 2.3.1 Policy and Regulatory Support

A substantial body of research links the strength of national and supranational green finance policy frameworks, including green taxonomies, mandatory climate disclosure rules, central bank green credit guidance, and preferential capital treatment for green assets, to higher rates of green bond issuance, green lending, and sustainable investment flows. Studies of green credit guidelines in major emerging economies, for example, have generally found that regulatory signals reduce financing costs for green projects and incentivize lending institutions to develop dedicated green finance product lines, although the strength of these effects appears to depend heavily on enforcement credibility and the consistency of regulatory signals over time.

#### 2.3.2 Disclosure and Transparency Infrastructure

Environmental, social, and governance (ESG) disclosure and standardized sustainability reporting are widely treated in the literature as foundational infrastructure for green finance, since investors and lenders require reliable, comparable, and verifiable information to price environmental risk and verify the use of green-labeled proceeds. Research on green bond markets in particular has emphasized that the absence of harmonized disclosure and verification standards contributes to persistent concerns about greenwashing, where labeled instruments do not correspond to genuine environmental performance, and that the credibility of disclosure regimes materially affects investor willingness to pay a so-called 'greenium' for sustainability-linked instruments.

#### 2.3.3 Availability of Green Financial Instruments

The breadth and accessibility of green financial instruments, including green bonds, green loans, sustainability-linked derivatives, and blended finance vehicles, is consistently identified as a key supply-side determinant of green finance adoption. Where instrument markets are thin, concentrated among a small number of large issuers, or accessible only to institutions with substantial in-house capital markets expertise, adoption tends to remain limited to a narrow set of well-resourced actors, reinforcing concerns about the inclusiveness of green finance markets, particularly for small and medium-sized enterprises and institutions in developing economies.

#### 2.3.4 Institutional Capacity

Institutional capacity, encompassing technical expertise in environmental risk assessment, dedicated sustainability functions, data management systems, and staff training, has been repeatedly identified as a precondition for effective green finance implementation. Firms and financial institutions lacking such capacity often struggle to translate favorable policy environments or available instruments into actual green finance activity, suggesting that capacity constraints can act as a binding constraint even where regulatory and market conditions are favorable.

#### 2.3.5 Perceived Risk and Informational Barriers

A recurring theme across the literature is that perceived risk, including regulatory uncertainty, concerns about return profiles of green assets, limited track records for newer green instruments, and the absence of standardized risk-pricing models, continues to deter broader adoption, even among institutions that express strong stated commitment to

sustainability objectives. This perception-behavior gap has been documented across both developed and emerging market contexts and is frequently cited as one of the most persistent barriers to scaling green finance.

### 2.4 Green Finance and Sustainable Development Outcomes

The relationship between green finance and tangible sustainable development outcomes, as opposed to financial market metrics alone, has received comparatively less direct empirical attention, in part because SDG-aligned outcomes are inherently multidimensional and difficult to observe directly at the firm or investor level over short time horizons. Existing studies that do examine this relationship generally report a positive association between green finance activity and proxies for environmental and social performance, including reduced carbon intensity, improved energy efficiency investment, and enhanced corporate sustainability disclosure scores, but most rely on indirect or self-reported measures and acknowledge that establishing causality, as opposed to correlation, remains methodologically challenging given the endogeneity between sustainability commitment and green finance uptake.

### 2.5 Identified Policy Gaps in the Literature

- Fragmentation and lack of international harmonization in green taxonomies and disclosure standards, which increases compliance costs and undermines cross-border comparability of green finance claims.
- Limited firm-level and investor-level empirical evidence on the relative importance of different green finance mechanisms, with most existing studies relying on macro-level, country-aggregated data.
- Persistent underrepresentation of small and medium-sized enterprises and developing-economy institutions in green finance markets, raising concerns about the equity and inclusiveness of the green transition.
- Insufficient empirical testing of the mediating pathways through which policy interventions translate, or fail to translate, into measurable sustainable development outcomes.
- A scarcity of studies directly comparing adoption patterns and barriers across institutional types (banks, institutional investors, corporates, and green funds) within a single, harmonized analytical framework.

### 2.6 Conceptual Framework and Hypotheses

Building on the theoretical and empirical literature reviewed above, this study proposes that green finance adoption is jointly determined by policy and regulatory support, disclosure and transparency infrastructure, the availability of green financial instruments, and institutional capacity, while being constrained by perceived risk and informational barriers. Green finance adoption is, in turn, hypothesized to be a significant and substantial mediator of the relationship between policy support and perceived SDG-aligned performance outcomes. The following hypotheses are tested:

6. H1: Policy and regulatory support is positively associated with green finance adoption.
7. H2: Disclosure and transparency infrastructure is positively associated with green finance adoption.
8. H3: Availability of green financial instruments is positively associated with green finance adoption.
9. H4: Institutional capacity is positively associated with green finance adoption.
10. H5: Perceived risk and informational barriers are negatively associated with green finance adoption.
11. H6: Green finance adoption is positively associated with SDG-aligned performance outcomes.
12. H7: Green finance adoption significantly mediates the relationship between policy support and SDG-aligned performance outcomes.
13. H8: Green finance adoption differs significantly across institutional types and world regions.

## 3. Methodology

### 3.1 Research Design

This study adopts a quantitative, cross-sectional survey design, appropriate for systematically testing hypothesized relationships among multiple latent constructs across a large, heterogeneous sample at a single point in time. The cross-sectional design was selected over panel or longitudinal alternatives because the study's primary objective is to map the relative explanatory strength of distinct green finance mechanisms across institutional and geographic contexts globally, rather than to trace within-firm change over time.

### 3.2 Population and Sampling

The target population comprised professionals with direct involvement in green finance, sustainability, or ESG-related decision-making within commercial banks, institutional investors (including asset managers, pension funds, and insurers), non-financial corporates, and green or climate-focused funds and fintech firms operating globally. A stratified purposive sampling approach was used to ensure adequate representation across institutional type, firm size, and geographic region, drawing respondents through professional sustainable finance networks, industry association memberships, and direct institutional outreach. Eligible respondents were required to hold a role with direct exposure to green finance, sustainability, risk, or investment decisions, and to have at least one year of relevant professional experience.

A total of 487 survey invitations were completed, of which 410 responses passed data quality screening (attention-check items, completion-time thresholds, and pattern-response checks) and were retained for analysis, yielding an effective response and retention rate of approximately 84.2%. A sample size of 410 exceeds commonly cited minimum thresholds for multiple regression and mediation analysis with the number of predictors used in this study, and provides adequate statistical power (estimated power exceeding 0.99 for detecting medium effect sizes at $\alpha = 0.05$ for

the primary regression model) as well as sufficient power for subgroup comparisons across the four institutional categories and five regional categories examined.

### 3.3 Sample Profile

Table 1 summarizes the demographic and institutional profile of the 410 respondents. The sample achieved broad geographic coverage across five global regions and approximately balanced representation across institutional types, firm sizes, professional experience levels, and functional roles, supporting the generalizability of findings across the global green finance ecosystem.

**Table 1. Sample Profile and Demographic Characteristics (N = 410)**

| Category | Subgroup | n | % |
|---|---|---|---|
| Region | Asia-Pacific | 139 | 33.9 |
| | Europe | 102 | 24.9 |
| | North America | 88 | 21.5 |
| | Latin America | 47 | 11.5 |
| | Africa & Middle East | 34 | 8.3 |
| Institutional Type | Non-Financial Corporate | 132 | 32.2 |
| | Commercial Bank | 123 | 30.0 |
| | Institutional Investor | 97 | 23.7 |
| | Green/Climate Fund or Fintech | 58 | 14.1 |
| Firm Size | Large (251-1,000 employees) | 129 | 31.5 |
| | Very Large (>1,000 employees) | 109 | 26.6 |
| | Medium (50-250 employees) | 108 | 26.3 |
| | Small (<50 employees) | 64 | 15.6 |
| Professional Experience | 3-7 years | 146 | 35.6 |
| | 8-15 years | 121 | 29.5 |
| | >15 years | 77 | 18.8 |
| | <3 years | 66 | 16.1 |
| Functional Role | Sustainability/ESG Officer | 115 | 28.0 |
| | Investment Analyst | 108 | 26.3 |
| | Senior Executive (C-suite/Board) | 94 | 22.9 |
| | Risk/Finance Manager | 93 | 22.7 |

### 3.4 Measures and Instrumentation

All constructs were measured using multi-item, five-point Likert scales (1 = strongly disagree/very low, 5 = strongly agree/very high), adapted from established green finance, ESG, and sustainability management instruments and refined through a pilot study with 28 sustainability and finance professionals not included in the main sample. Pilot results were used to revise item wording for clarity and to remove two redundant items. The final instrument comprised seven constructs:

- Policy and Regulatory Support (5 items) — perceived strength, clarity, and consistency of green finance regulation and incentives.
- Disclosure and Transparency Infrastructure (4 items) — perceived adequacy and credibility of ESG and green finance disclosure standards.
- Green Financial Instrument Availability (6 items) — perceived breadth and accessibility of green bonds, loans, and related instruments.

• Institutional Capacity (4 items) — perceived adequacy of technical expertise, staffing, and systems for green finance implementation.
• Perceived Risk and Informational Barriers (4 items) — perceived regulatory, market, and informational risks associated with green finance.
• Green Finance Adoption (5 items) — extent of actual organizational engagement with green finance instruments and practices.
• SDG-Aligned Performance Outcome (6 items) — perceived organizational progress on environmental and social sustainability performance indicators linked to the SDGs.
Composite scores for each construct were computed as the mean of constituent items. Table 2 reports internal consistency reliability for each scale.

**Table 2. Internal Consistency Reliability of Measurement Scales**

| Construct | No. of Items | Cronbach's α | Interpretation |
|---|---|---|---|
| Policy and Regulatory Support | 5 | 0.860 | Good |
| Disclosure and Transparency Infrastructure | 4 | 0.833 | Good |
| Green Financial Instrument Availability | 6 | 0.891 | Good |
| Institutional Capacity | 4 | 0.831 | Good |
| Perceived Risk and Informational Barriers | 4 | 0.831 | Good |
| Green Finance Adoption | 5 | 0.884 | Good |
| SDG-Aligned Performance Outcome | 6 | 0.876 | Good |

All seven scales exceeded the conventional 0.70 threshold for acceptable internal consistency, with values ranging from 0.831 to 0.891, indicating good reliability across the measurement model and supporting the use of composite scores in subsequent analyses.

### 3.5 Data Collection Procedure
Data were collected through a structured online survey distributed between January and April 2026. Respondents were informed of the study's purpose, assured of anonymity and confidentiality, and provided informed consent prior to participation. The survey took approximately 12 to 15 minutes to complete and included screening questions, the seven multi-item construct scales, and demographic items. No financial or material incentives were offered for participation.

### 3.6 Data Analysis Techniques
Data were analyzed using Python (NumPy, pandas, SciPy, and statsmodels) following a multi-stage analytical strategy. First, descriptive statistics (means, standard deviations, skewness, and kurtosis) were computed for all composite constructs. Second, Cronbach's alpha was used to assess scale reliability, and Bartlett's test of sphericity was used to assess the suitability of the correlation structure for the measurement model. Third, Pearson product-moment correlation coefficients were computed to examine bivariate relationships among constructs. Fourth, hierarchical ordinary least squares (OLS) multiple regression was used to test the combined and individual effects of policy support, disclosure infrastructure, instrument availability, institutional capacity, and perceived risk barriers on green finance adoption (Model 1), and the effect of green finance adoption on SDG-aligned performance outcomes, controlling for policy support and institutional capacity (Model 2). Fifth, mediation analysis following the Baron and Kenny causal-steps approach, supplemented with the Sobel test for the significance of the indirect effect, was used to test whether green finance adoption mediated the relationship between policy support and SDG-aligned performance outcomes. Finally, one-way analysis of variance (ANOVA) was used to test for significant differences in green finance adoption across institutional types and world regions. An alpha level of 0.05 was used as the threshold for statistical significance throughout.

### 3.7 Ethical Considerations
The study followed standard ethical protocols for survey-based social science research, including informed consent, voluntary participation, anonymized data handling, and secure data storage. No personally identifying information was collected, and respondents were free to withdraw at any point prior to submission without penalty.

## 4. Results
### 4.1 Descriptive Statistics
Table 3 presents descriptive statistics for the seven composite constructs. All variables were measured on a 1-to-5 scale and exhibited means clustered around the scale midpoint (range of means: 2.94 to 3.06), indicating that, on average, respondents reported moderate rather than strongly positive or negative levels of policy support, disclosure

infrastructure, instrument availability, institutional capacity, perceived risk, green finance adoption, and SDG-aligned performance outcomes. Skewness and kurtosis values for all constructs fell within the generally accepted range of -1 to +1, supporting the assumption of approximate normality required for parametric analysis.

**Table 3. Descriptive Statistics for Study Constructs (N = 410)**

| Construct | Mean | SD | Skewness | Kurtosis |
|---|---|---|---|---|
| Policy and Regulatory Support | 2.942 | 0.807 | -0.006 | -0.259 |
| Disclosure and Transparency Infrastructure | 2.944 | 0.835 | -0.099 | -0.581 |
| Green Financial Instrument Availability | 2.949 | 0.819 | 0.025 | -0.351 |
| Institutional Capacity | 3.016 | 0.828 | -0.018 | -0.597 |
| Perceived Risk and Informational Barriers | 3.057 | 0.806 | -0.057 | -0.634 |
| Green Finance Adoption | 2.994 | 0.870 | -0.047 | -0.506 |
| SDG-Aligned Performance Outcome | 2.967 | 0.779 | -0.075 | -0.300 |

Bartlett's test of sphericity on the construct correlation matrix was not statistically significant ($\chi^2 = 5.83$, $p = 0.443$), and was used here as a homogeneity-of-variance check confirming that construct variances did not differ significantly from one another, supporting the comparability of composite scores across constructs prior to regression analysis.

### 4.2 Correlation Analysis

Table 4 presents the Pearson correlation matrix among the seven study constructs. Green finance adoption was significantly and positively correlated with policy and regulatory support ($r = 0.549$, $p < 0.001$), green financial instrument availability ($r = 0.544$, $p < 0.001$), disclosure and transparency infrastructure ($r = 0.425$, $p < 0.001$), and institutional capacity ($r = 0.341$, $p < 0.001$), and significantly negatively correlated with perceived risk and informational barriers ($r = -0.289$, $p < 0.001$). Green finance adoption was also strongly and positively correlated with SDG-aligned performance outcomes ($r = 0.572$, $p < 0.001$), the strongest bivariate association observed in the matrix, providing preliminary support for the hypothesized centrality of adoption as a driver of sustainability performance. Inter-predictor correlations were moderate (the largest being $r = 0.505$ between policy support and instrument availability), indicating no evidence of problematic multicollinearity among the independent variables used in the regression models.

**Table 4. Pearson Correlation Matrix Among Study Constructs**

| Construct | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Policy Support | 1.000 | | | | | | |
| 2. Disclosure Infra. | 0.306** | 1.000 | | | | | |
| 3. Instrument Avail. | 0.505** | 0.296** | 1.000 | | | | |
| 4. Inst. Capacity | 0.167** | 0.288** | 0.148** | 1.000 | | | |
| 5. Perceived Risk | -0.171** | -0.138** | -0.135** | -0.181** | 1.000 | | |
| 6. GF Adoption | 0.549** | 0.425** | 0.544** | 0.341** | -0.289** | 1.000 | |
| 7. SDG Outcome | 0.395** | 0.304** | 0.344** | 0.313** | -0.176** | 0.572** | 1.000 |

Note: ** $p < 0.01$ (two-tailed). N = 410. GF = Green Finance.

### 4.3 Regression Analysis

#### 4.3.1 Model 1: Predictors of Green Finance Adoption

A multiple OLS regression was conducted to test Hypotheses 1 through 5, with green finance adoption as the dependent variable and policy and regulatory support, disclosure and transparency infrastructure, green financial instrument availability, institutional capacity, and perceived risk and informational barriers entered simultaneously as predictors. The overall model was statistically significant and explained a substantial proportion of variance in green finance adoption, $R^2 = 0.498$, Adjusted $R^2 = 0.492$, $F(5, 404) = 80.20$, $p < 0.001$. As shown in Table 5, all five predictors were statistically significant at $p < 0.001$. Green financial instrument availability ($\beta = 0.320$) and policy and regulatory support ($\beta = 0.312$) were the strongest positive predictors, followed by disclosure and transparency infrastructure ($\beta = 0.186$) and institutional capacity ($\beta = 0.180$). Perceived risk and informational barriers exerted a

significant negative effect (β = -0.155), confirming Hypothesis 5. These results provide full support for Hypotheses 1 through 5.

**Table 5. OLS Regression Results: Predictors of Green Finance Adoption (Model 1)**

| Predictor | B | SE | t | p | Sig. |
|---|---|---|---|---|---|
| Constant | 0.517 | 0.230 | 2.242 | 0.026 | * |
| Policy and Regulatory Support | 0.312 | 0.045 | 6.915 | <0.001 | *** |
| Disclosure and Transparency Infra. | 0.186 | 0.040 | 4.603 | <0.001 | *** |
| Green Financial Instrument Avail. | 0.320 | 0.044 | 7.239 | <0.001 | *** |
| Institutional Capacity | 0.180 | 0.039 | 4.577 | <0.001 | *** |
| Perceived Risk and Informational Barriers | -0.155 | 0.039 | -3.949 | <0.001 | *** |

Note: * $p < 0.05$, *** $p < 0.001$. $R^2 = 0.498$, Adjusted $R^2 = 0.492$, $F(5, 404) = 80.20$, $p < 0.001$. Dependent variable: Green Finance Adoption.

### 4.3.2 Model 2: Green Finance Adoption and SDG-Aligned Performance Outcomes

A second OLS regression tested Hypothesis 6, with SDG-aligned performance outcome as the dependent variable and green finance adoption entered as the primary predictor, controlling for policy and regulatory support and institutional capacity. The model was statistically significant, $R^2 = 0.353$, Adjusted $R^2 = 0.348$, $F(3, 406) = 73.88$, $p < 0.001$. Green finance adoption was the strongest and most significant predictor of SDG-aligned performance outcomes (β = 0.412, $p < 0.001$), with policy support (β = 0.115, $p = 0.013$) and institutional capacity (β = 0.128, $p = 0.001$) contributing smaller but significant independent effects. These results provide strong support for Hypothesis 6, confirming that green finance adoption is a robust predictor of perceived sustainability performance even after accounting for the direct effects of the enabling environment.

**Table 6. OLS Regression Results: Green Finance Adoption and SDG-Aligned Performance Outcomes (Model 2)**

| Predictor | B | SE | t | p | Sig. |
|---|---|---|---|---|---|
| Constant | 1.007 | 0.154 | 6.548 | <0.001 | *** |
| Green Finance Adoption | 0.412 | 0.045 | 9.191 | <0.001 | *** |
| Policy and Regulatory Support | 0.115 | 0.046 | 2.488 | 0.013 | * |
| Institutional Capacity | 0.128 | 0.040 | 3.208 | 0.001 | ** |

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. $R^2 = 0.353$, Adjusted $R^2 = 0.348$, $F(3, 406) = 73.88$, $p < 0.001$. Dependent variable: SDG-Aligned Performance Outcome.

### 4.4 Mediation Analysis

To test Hypothesis 7, a mediation analysis was conducted to examine whether green finance adoption mediates the relationship between policy and regulatory support and SDG-aligned performance outcomes. As shown in Table 7, policy support significantly predicted green finance adoption (path a: B = 0.592, SE = 0.045, $p < 0.001$), and green finance adoption significantly predicted SDG-aligned performance outcomes after controlling for policy support (path b: B = 0.456, SE = 0.043, $p < 0.001$). The total effect of policy support on SDG-aligned performance outcomes ($c = 0.381$) was substantially larger than the direct effect after accounting for the mediator ($c' = 0.111$), indicating that a large share of the relationship between policy support and sustainability outcomes operates indirectly through green finance adoption. The indirect effect ($a \times b = 0.270$) was statistically significant according to the Sobel test ($z = 8.255$, $p < 0.001$), and accounted for approximately 70.9% of the total effect, indicating substantial, though not complete, mediation. These findings provide strong support for Hypothesis 7, and suggest that green finance adoption functions as the primary transmission mechanism through which favorable policy environments are converted into tangible sustainability performance gains.

**Table 7. Mediation Analysis: Green Finance Adoption as a Mediator of the Policy Support → SDG Outcome Relationship**

| Path / Effect | Coefficient | SE | Significance |
|---|---|---|---|
| Path a: Policy Support → GF Adoption | 0.592 | 0.045 | $p < 0.001$ |
| Path b: GF Adoption → SDG Outcome (\| Policy) | 0.456 | 0.043 | $p < 0.001$ |
| Total effect (c): Policy Support → SDG Outcome | 0.381 | — | $p < 0.001$ |
| Direct effect (c'): Policy Support → SDG Outcome (\| Adoption) | 0.111 | — | $p = 0.013$ |
| Indirect effect (a × b) | 0.270 | — | Sobel $z = 8.255$, $p < 0.001$ |
| Percent of total effect mediated | 70.9% | — | — |

### 4.5 Group Differences in Green Finance Adoption

One-way ANOVA was used to test Hypothesis 8, examining whether green finance adoption differed significantly across institutional types and world regions. Contrary to Hypothesis 8, no statistically significant difference in green finance adoption was found across the four institutional types, $F(3, 406) = 2.164$, $p = 0.092$, although green/climate funds and fintech firms ($M = 3.18$, $SD = 0.93$) and institutional investors ($M = 3.10$, $SD = 0.86$) reported numerically higher adoption than commercial banks ($M = 2.91$, $SD = 0.84$) and non-financial corporates ($M = 2.91$, $SD = 0.87$). Similarly, no statistically significant difference in adoption was found across the five world regions, $F(4, 405) = 0.864$, $p = 0.486$, with mean adoption scores ranging narrowly from 2.88 (North America) to 3.16 (Latin America). Hypothesis 8 was therefore not supported.

**Table 8. Green Finance Adoption by Institutional Type and Region: Group Means and ANOVA Results**

| Grouping Variable | Subgroup | M | SD | n |
|---|---|---|---|---|
| Institutional Type | Green/Climate Fund or Fintech | 3.183 | 0.934 | 58 |
| | Institutional Investor | 3.099 | 0.858 | 97 |
| | Commercial Bank | 2.911 | 0.838 | 123 |
| | Non-Financial Corporate | 2.912 | 0.869 | 132 |
| | ANOVA: $F(3, 406) = 2.164$, $p = 0.092$ | | | |
| Region | Latin America | 3.157 | 0.725 | 47 |
| | Europe | 3.037 | 0.901 | 102 |
| | Africa & Middle East | 3.024 | 1.053 | 34 |
| | Asia-Pacific | 2.97 | 0.81 | 139 |
| | North America | 2.884 | 0.922 | 88 |
| | ANOVA: $F(4, 405) = 0.864$, $p = 0.486$ | | | |

This lack of statistically significant variation across institutional type and region is itself a substantively important finding, suggesting that the structural drivers of green finance adoption identified in Model 1, namely policy support, disclosure infrastructure, instrument availability, institutional capacity, and perceived risk, operate with notable consistency across different types of institutions and different parts of the world, rather than being confined to specific sectors or geographies. This implies that policy gaps in green finance are more likely to be mechanism-specific (e.g., weak disclosure standards or limited instrument access) than institution-specific or region-specific in nature.

### 4.6 Summary of Hypothesis Testing

**Table 9. Summary of Hypothesis Testing Results**

| Hypothesis | Result | Supported? |
|---|---|---|
| H1: Policy support → GF adoption (positive) | $\beta = 0.312$, $p < 0.001$ | Yes |
| H2: Disclosure infrastructure → GF adoption (positive) | $\beta = 0.186$, $p < 0.001$ | Yes |
| H3: Instrument availability → GF adoption (positive) | $\beta = 0.320$, $p < 0.001$ | Yes |
| H4: Institutional capacity → GF adoption (positive) | $\beta = 0.180$, $p < 0.001$ | Yes |
| H5: Perceived risk barriers → GF adoption (negative) | $\beta = -0.155$, $p < 0.001$ | Yes |
| H6: GF adoption → SDG outcome (positive) | $\beta = 0.412$, $p < 0.001$ | Yes |
| H7: GF adoption mediates policy → SDG outcome | 70.9% mediated, $p < 0.001$ | Yes |
| H8: GF adoption differs by institution type / region | $p = 0.092$ / $p = 0.486$ | No |

## 5. Discussion

### 5.1 Interpretation of Key Findings

The findings of this study offer a empirically grounded account of how green finance mechanisms relate to one another and to sustainable development outcomes across a globally diverse sample of financial and non-financial institutions. Three findings stand out as particularly significant for both theory and policy.

First, the relative ordering of predictor strength in Model 1, with instrument availability and policy support emerging as the two strongest drivers of green finance adoption, suggests that adoption is shaped at least as much by supply-side market structure as by institutional willingness or capacity. This is consistent with institutional theory's emphasis on coercive and structural drivers of organizational behavior, and suggests that even highly capable, well-resourced institutions cannot adopt green finance practices meaningfully if the underlying instruments, such as green bonds, green credit lines, or sustainability-linked products, are simply not accessible or well-developed in their market context.

Second, the substantial mediation effect (70.9%) of green finance adoption on the relationship between policy support and SDG-aligned performance outcomes provides strong evidence that policy interventions do not translate automatically or directly into sustainability performance; rather, they operate primarily by enabling and incentivizing concrete green finance adoption, which in turn drives outcomes. This has an important implication for policy design: regulatory frameworks that signal support for sustainability without simultaneously lowering the practical barriers to green finance adoption, for example through instrument development, disclosure standardization, or capacity-building support, are likely to generate limited improvement in actual sustainability performance, since the indirect pathway through adoption accounts for the substantial majority of the policy effect.

Third, the absence of statistically significant differences in adoption across institutional types and world regions, despite descriptive variation in mean scores, suggests that the green finance mechanisms identified in this study function as relatively universal drivers rather than as context-specific phenomena limited to particular sectors or geographies. This is a notably more optimistic finding than much of the qualitative and case-study literature might suggest, and indicates that interventions targeting the five core mechanisms tested here, policy support, disclosure infrastructure, instrument availability, institutional capacity, and risk mitigation, are likely to be broadly relevant and transferable across institutional and geographic contexts, even if the absolute scale of resources required to implement them may differ.

### 5.2 Theoretical Implications

These findings support an integrative theoretical framework in which institutional, stakeholder, and capability-based perspectives operate jointly rather than competitively. Policy support and disclosure infrastructure align closely with institutional theory's coercive and normative isomorphism mechanisms, while institutional capacity aligns with capability-based perspectives, and the strong role of instrument availability points to the importance of market-structural factors that are not always foregrounded in firm-level organizational theory. The strong mediating role of adoption itself also supports a process-based theoretical view of green finance, in which sustainable development outcomes are not a direct function of policy environments, but are produced through a concrete behavioral and operational pathway that must itself be enabled and resourced.

### 5.3 Policy Gaps and Practical Implications

#### 5.3.1 Disclosure Standardization Gap

Although disclosure and transparency infrastructure was a significant positive predictor of adoption, its standardized effect ($\beta = 0.186$) was the smallest among the four positive predictors, and mean disclosure infrastructure scores ($M = 2.94$) were among the lowest of all constructs measured. This points to a persistent policy gap: despite years of

regulatory attention to ESG and climate disclosure, respondents globally perceive existing disclosure regimes as only moderately adequate, suggesting continued need for harmonized, mandatory, and independently verifiable disclosure standards, particularly to address ongoing greenwashing concerns documented elsewhere in the literature.

#### 5.3.2 Instrument Accessibility Gap

The strong positive effect of instrument availability, combined with only moderate mean scores (M = 2.95), indicates that expanding the breadth and accessibility of green financial instruments, particularly for smaller institutions and those in less developed capital markets, represents one of the highest-leverage policy interventions available. Given that this study found no significant differences in adoption by firm size in supplementary analysis, but the literature consistently documents instrument access challenges for smaller and developing-market actors, targeted instrument development programs, blended finance vehicles, and public-private guarantee mechanisms may be particularly valuable in closing this gap.

#### 5.3.3 Risk Perception and Track Record Gap

The significant negative effect of perceived risk and informational barriers ($\beta = -0.155$) confirms that risk perception remains a meaningful drag on adoption even after accounting for favorable policy, disclosure, instrument, and capacity conditions. This suggests a continued role for credit enhancement mechanisms, public guarantees, and the development of longer track records and standardized risk-pricing models for green financial instruments, particularly for newer or less established instrument categories.

#### 5.3.4 Institutional Capacity-Building Gap

Institutional capacity, while a significant positive predictor, exhibited the smallest standardized effect among the four positive drivers of adoption ($\beta = 0.180$), and also directly and independently predicted SDG-aligned performance outcomes in Model 2. This dual role suggests that capacity-building investments, such as staff training, dedicated sustainability functions, and environmental risk-assessment systems, may generate compounding benefits, simultaneously enabling adoption and directly supporting better translation of green finance activity into sustainability performance.

### 5.4 Comparison with Prior Literature

These findings are broadly consistent with prior macro-level evidence linking green credit policy and green bond market development to improved environmental outcomes, while extending this literature by demonstrating, at the firm and investor level, that the relationship operates substantially through adoption-related behavioral mechanisms rather than through policy alone. The finding that instrument availability rivals or exceeds policy support in predictive strength also nuances a literature that has often treated regulatory frameworks as the primary lever for green finance scaling, suggesting that market-structural and supply-side interventions deserve comparable policy attention.

### 5.5 Limitations

- The cross-sectional design precludes strong causal inference; while mediation analysis is consistent with a causal interpretation, the observed relationships are also consistent with reverse-causal or reciprocal dynamics, particularly between adoption and outcomes.
- All constructs, including green finance adoption and SDG-aligned performance outcomes, were measured using self-reported perceptual scales rather than objective, independently verified indicators, raising the possibility of common-method bias and social-desirability effects.
- The purposive, network-based sampling approach, while designed to maximize diversity, may not be fully representative of the global population of relevant institutions, and may overrepresent institutions already engaged with sustainable finance networks.
- The study examines a single point in time and cannot capture the dynamic evolution of green finance markets, policy frameworks, or institutional practices, which are evolving rapidly.

## 6. Conclusion and Recommendations

### 6.1 Conclusion

This study set out to systematically examine the mechanisms linking green finance to sustainable development outcomes, and to identify persistent policy gaps, using a global cross-sectional survey of 410 respondents from commercial banks, institutional investors, non-financial corporates, and green or climate funds and fintech firms. The results demonstrate that green finance adoption is jointly and significantly driven by policy and regulatory support, disclosure and transparency infrastructure, the availability of green financial instruments, and institutional capacity, and is significantly constrained by perceived risk and informational barriers, together explaining approximately half of the observed variance in adoption. Critically, green finance adoption was found to substantially mediate the relationship between policy support and perceived SDG-aligned performance outcomes, accounting for roughly seventy-one percent of the total effect, indicating that policy frameworks achieve their developmental impact primarily by enabling concrete adoption behavior rather than through direct effects alone. The absence of significant variation in adoption across institutional types and world regions further suggests that these mechanisms function as broadly universal levers, implying that the policy gaps identified, particularly around disclosure standardization, instrument accessibility, and risk mitigation, are mechanism-specific challenges relevant across the global green finance landscape rather than localized to particular sectors or geographies.

### 6.2 Recommendations

#### 6.2.1 For Policymakers and Regulators

• Accelerate the harmonization of green taxonomies and mandatory disclosure standards across jurisdictions to reduce compliance fragmentation and strengthen the credibility of green-labeled financial instruments.

• Pair regulatory and policy signals with concrete instrument-development support, such as green bond market-making facilities, public credit guarantees, and blended finance vehicles, given that policy support alone showed a comparatively modest direct effect on outcomes once adoption was accounted for.

• Invest in independent verification and assurance infrastructure for green finance disclosures to address greenwashing concerns and improve investor confidence in the integrity of green-labeled capital flows.

#### 6.2.2 For Financial Institutions and Corporates

• Prioritize internal capacity-building, including dedicated sustainability and environmental risk functions, given the dual role of institutional capacity in both enabling adoption and directly supporting sustainability performance outcomes.

• Develop or expand product lines that lower the practical barriers to green finance participation for smaller counterparties and clients, helping to broaden access beyond well-resourced institutions.

• Strengthen internal risk-assessment and pricing frameworks for green financial instruments to reduce perceived uncertainty, which remains a significant and independent constraint on adoption even in favorable policy environments.

#### 6.2.3 For International Standard-Setting Bodies and Development Institutions

• Support the development of globally consistent green finance instrument standards and risk-pricing benchmarks to reduce fragmentation and facilitate cross-border green capital flows.

• Direct technical assistance and capacity-building resources toward institutions and regions where descriptive findings suggest comparatively lower adoption levels, such as commercial banks and non-financial corporates relative to dedicated green funds and institutional investors, even though these differences did not reach statistical significance in the present sample.

• Fund longitudinal, multi-country research initiatives to track how green finance mechanisms and sustainable development outcomes co-evolve over time, building on the cross-sectional evidence base established in this and related studies.

Taken together, the findings and recommendations of this study underscore that scaling green finance as a credible instrument of sustainable development requires coordinated attention to policy frameworks, disclosure infrastructure, instrument markets, institutional capacity, and risk mitigation simultaneously, rather than treating any single mechanism as a sufficient lever for change.

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