

The Role of Green Financial Literacy, Sustainable Awareness, Green Banking Products, and Regulatory Support in Shaping Consumer Adoption of Sustainable Finance Services

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Abstract

This study investigates the role of green financial literacy, sustainable awareness, green banking products, and regulatory support in shaping consumer adoption of sustainable finance services. With increasing global emphasis on environmental sustainability, understanding the factors influencing consumer engagement with green financial products is essential for promoting responsible financial behavior. Using a quantitative approach, data were collected from 250 consumers via structured questionnaires and analyzed using Structural Equation Modeling (SEM). The results indicate that all four factors significantly and positively influence adoption behavior, with green financial literacy having the strongest effect, followed by sustainable awareness, green banking products, and regulatory support. These findings highlight the need for a holistic strategy that integrates knowledge enhancement, awareness programs, accessible product offerings, and robust regulatory frameworks to foster sustainable financial practices. The study provides theoretical contributions by linking financial literacy, environmental awareness, product innovation, and institutional support to adoption behavior and practical implications for policymakers, financial institutions, and educators in advancing sustainable finance markets.

Keywords: Strategic Agility; Organizational Resilience; Business Continuity; Dynamic Capabilities; Adaptive Strategy; Organizational Performance; Uncertainty Management.

1. Introduction

In recent years, the global financial landscape has undergone a profound transformation influenced by increasing environmental concerns, the urgency of climate change mitigation, and the rising demand for responsible economic practices. Sustainable finance has emerged as a strategic approach that aligns financial decisions with environmental, social, and governance (ESG) considerations. This shift is not only driven by institutional reforms but also by the evolving values and preferences of consumers who increasingly prioritize sustainability in their financial activities (Obadire & Moyo, 2024). Financial institutions, regulators, and policymakers have therefore begun to explore ways to enhance consumer participation in sustainable finance, particularly by promoting knowledge, awareness, and access to green financial products.

A central element shaping consumer engagement in sustainable finance is green financial literacy, which refers to an individual's understanding of environmentally friendly financial



practices, products, and risk–return dynamics. Consumers with stronger green financial literacy are more capable of evaluating sustainable investment options, understanding the long-term benefits of green technologies, and navigating financial instruments such as green bonds, sustainable mutual funds, and eco-loans (Desai & Prajapati, 2024). Furthermore, financial literacy enhances consumer confidence, enabling individuals to make informed decisions about adopting sustainable finance services. As sustainable finance becomes increasingly complex, improving green financial literacy is essential to ensure that consumers can participate effectively in the transition toward a low-carbon economy.

In addition to financial knowledge, sustainable awareness plays a significant role in influencing consumer behavior. Sustainable awareness encompasses environmental consciousness, personal responsibility toward the planet, and an understanding of the broader socio-environmental impacts of consumption and financial choices. Individuals with high levels of sustainable awareness are more likely to engage in environmentally responsible behaviors, including the adoption of green financial services (Chauhan et al., 2025). Awareness fosters value-driven decision-making, where consumers consider not only financial benefits but also ecological consequences. As sustainable development becomes a global priority, enhancing public awareness is crucial for strengthening the demand for sustainable financial solutions.

Financial institutions themselves contribute to the process through green banking products, which include financial innovations such as green credit cards, renewable energy loans, carbon-offset banking programs, and sustainable investment portfolios. These products serve as practical mechanisms for consumers to participate in environmentally responsible finance (Jain et al., 2025; Makorere, 2025). The availability, accessibility, and design of green banking products play a major role in shaping consumer interest and adoption behavior. When green products are clearly communicated, easy to access, and perceived as trustworthy, consumers are more likely to integrate them into their financial activities. Thus, the role of banks and financial service providers is instrumental in guiding consumers toward sustainable financial choices.

Finally, regulatory support forms the institutional backbone of sustainable finance adoption. Governments and regulatory bodies establish policies, standards, and incentives aimed at accelerating the transition toward sustainability. These regulations may involve mandatory ESG disclosures, tax incentives for green investments, national green finance roadmaps, and guidelines for sustainable banking operations (Johri & Singh, 2024). Regulatory support not only ensures the credibility and transparency of sustainable finance but also influences consumer confidence and willingness to adopt green financial services. In regions where regulatory frameworks are strong and consistent, sustainable finance markets tend to grow more rapidly. Therefore, regulatory intervention acts as a catalyst that connects consumer awareness, financial literacy, and green product availability into a cohesive system supporting sustainable development.

Despite the growing global emphasis on sustainable finance, consumer adoption remains uneven and often limited by gaps in financial literacy, insufficient awareness, limited availability of green banking products, and varying degrees of regulatory enforcement. Many consumers still lack the knowledge and confidence needed to evaluate sustainable financial services, resulting in low participation rates. Simultaneously, although banks increasingly

introduce environmentally friendly products, consumers may remain unfamiliar with or skeptical of their benefits. Regulatory support, while present in many countries, often lacks clarity or is inconsistently implemented, reducing its effectiveness in driving consumer adoption. This situation underscores the need for comprehensive research that examines how green financial literacy, sustainable awareness, green banking products, and regulatory support collectively shape consumer behavior in adopting sustainable finance services.

This study aims to analyze the role of green financial literacy, sustainable awareness, green banking products, and regulatory support in shaping consumer adoption of sustainable finance services. Specifically, the research investigates how each factor individually and collectively influences consumer decision-making, while providing insights into the mechanisms that encourage greater participation in sustainable finance. The findings are expected to contribute to the development of strategies for policymakers, financial institutions, and stakeholders to strengthen the sustainable finance ecosystem and promote responsible consumer behavior.

2. Literature Review and Hypothesis Development

2.1. Green Financial Literacy and Consumer Adoption of Sustainable Finance

Green financial literacy has emerged as a crucial determinant in shaping consumers' understanding and use of sustainable financial services. It extends the traditional concept of financial literacy by framing financial decisions within the context of environmental sustainability. Scholars define green financial literacy as the ability to comprehend green investment products, evaluate their risk–return characteristics, and understand their environmental impact (Hussain et al., 2024). Studies highlight that individuals with a strong grasp of sustainable financial concepts are more likely to explore and adopt eco-friendly financial solutions, as knowledge reduces uncertainty and strengthens perceived behavioral control (Bouma et al., 2017).

Furthermore, the literature shows a positive relationship between financial literacy and sustainable investment decisions. Consumers with a higher literacy level can differentiate between conventional and sustainable financial products, assess long-term environmental benefits, and identify credible investment opportunities (Shokeen, 2025). The cognitive foundation provided by green financial literacy enables consumers to make rational, informed decisions rather than relying on emotional or value-driven impulses alone. Several studies argue that without adequate understanding, sustainable finance remains an abstract concept, leading to low consumer participation (Hidayat-ur-Rehman, 2025).

The influence of green financial literacy is also evident in various demographic segments. Younger consumers, for example, often express interest in environmental issues but lack sufficient knowledge about sustainable investment instruments, creating a gap between intention and behavior (Hidayat-ur-Rehman & Hossain, 2025). Meanwhile, consumers with financial or environmental education backgrounds tend to exhibit a stronger inclination toward green financial products (Huong, 2024).

2.2. Sustainable Awareness and Its Influence on Adoption Behavior

Sustainable awareness refers to an individual's understanding of environmental issues, ecological impacts, and the significance of sustainable behaviors. Awareness is considered a primary driver in shaping consumer attitudes and decisions in sustainable consumption domains, including sustainable finance (Hettige et al., 2024). Scholars argue that awareness elevates an individual's sense of responsibility and moral obligation, thereby motivating actions aligned with environmental preservation. When consumers are aware of the consequences of climate change and environmental degradation, they are more inclined to engage in behaviors that reflect ecological concern, including selecting green financial services (Khan et al., 2025).

Environmental psychology literature emphasizes that awareness influences both the emotional and cognitive dimensions of consumer decision-making. For instance, individuals with high environmental awareness tend to evaluate financial products not only in terms of personal returns but also through the lens of social and ecological impact (Mei et al., 2024). This shift in evaluative criteria expands the traditional utility-based model of financial behavior and introduces sustainability-oriented preferences. The theory of planned behavior suggests that awareness shapes attitudes, which subsequently influence behavioral intentions and actual adoption (Ajzen, 1991).

Moreover, several empirical studies indicate that consumers who perceive environmental issues as urgent are more likely to support financial initiatives that contribute to climate solutions, such as green bonds or renewable energy loans (Ellahi et al., 2023). Awareness also enhances trust in sustainable finance initiatives, as consumers who are well-informed tend to believe that their participation has meaningful environmental benefits. Nevertheless, the literature also identifies gaps: even aware consumers may hesitate if financial products are perceived as complex, risky, or poorly explained. Thus, sustainable awareness is influential but must be complemented by financial literacy, product availability, and institutional support to translate knowledge into actual adoption.

2.3. Green Banking Products and Financial Innovation

Green banking products represent a key medium through which consumers participate in sustainable finance. These products include green savings accounts, green home financing, electric vehicle loans, carbon-neutral credit cards, sustainable investment portfolios, and financing instruments supporting renewable energy or eco-friendly business practices (Park & Kim, 2020). Literature indicates that the success of sustainable finance adoption depends significantly on the availability, accessibility, and perceived value of such products (Sharma et al., 2025).

Adoption behavior is strongly shaped by the perceived usefulness and ease of use of financial products, as posited by the Technology Acceptance Model (Venkatesh et al., 2003). When green banking products are user-friendly, transparently structured, and clearly beneficial, consumers are more likely to show interest. Conversely, when products appear unfamiliar or overly complex, consumers may perceive them as risky or inconvenient. Studies have shown that product design, communication strategies, and marketing approaches greatly influence how consumers interpret the value of sustainable finance offerings (Upadhyaya & Zope, n.d.).

Furthermore, empirical research consistently highlights trust as a crucial factor. Consumers are more likely to adopt green banking products when they trust the institution's commitment to sustainability and believe that the products genuinely align with environmental goals (Serđarušić et al., 2024). Cases of "greenwashing" reported in various industries have contributed to consumer skepticism, underscoring the importance of transparency. Thus, financial institutions play a central role not only in providing products but also in establishing credibility and educating consumers about their environmental significance. Innovations in green financial instruments also influence adoption. As financial markets introduce new types of green products, such as sustainability-linked loans, green exchange-traded funds, and impact investment platforms—the diversity of options increases, attracting consumers with differing risk preferences and sustainability priorities (Shokeen, 2025). However, the literature also notes that without adequate institutional and regulatory support, product innovation alone may not translate into widespread adoption.

2.4. Regulatory Support and Institutional Frameworks

Regulatory support forms the structural foundation that enables sustainable finance markets to flourish. Governments and regulatory bodies shape market conditions through policies, frameworks, incentives, and guidelines aimed at promoting sustainability-driven financial behavior (Sharma et al., 2025). Studies emphasize that clear regulatory frameworks enhance consumer and investor confidence by ensuring that sustainable finance products meet credible standards and reporting requirements (Park & Kim, 2020).

Regulatory initiatives include environmental risk management guidelines, mandatory ESG disclosures, tax incentives for green investments, and national sustainable finance strategies. These mechanisms reduce information asymmetry between financial institutions and consumers, making it easier for consumers to trust and adopt green financial services (Ellahi et al., 2023). For example, regulations requiring transparency in green bond issuance increase consumer assurance that their investments genuinely support environmental objectives.

Moreover, literature shows that regions with strong regulatory enforcement exhibit higher adoption of sustainable finance products (Mei et al., 2024). In contrast, inconsistent or weak regulatory frameworks lead to skepticism, lower product credibility, and slow market development. Regulators also play an educational role by collaborating with financial institutions, NGOs, and academic bodies to raise public awareness and establish credibility in sustainable finance markets.

3. Method

3.1. Research Design

This study adopts a quantitative research design to examine the influence of green financial literacy, sustainable awareness, green banking products, and regulatory support on consumer adoption of sustainable finance services. A quantitative approach is appropriate because the research aims to test relationships between variables and measure behavioral tendencies across a large population. The study employs a structured questionnaire as the primary data collection instrument, designed using validated measurement scales adapted from prior sustainability and financial behavior studies. Each construct (green financial literacy,

sustainable awareness, green banking products, regulatory support, and adoption of sustainable finance services) is operationalized through multi-item Likert-type questions to ensure reliability and comparability. Before full deployment, a pilot test involving a small group of respondents is conducted to confirm clarity, internal consistency, and face validity of the instrument.

The target population for this study consists of consumers who have experience with or interest in banking and financial services in the selected region. A probability sampling method, specifically simple random sampling, is used to ensure a representative and unbiased sample. The sample size is determined using established guidelines for multivariate analysis, ensuring adequate statistical power for the tests employed (the amount of sample size is 250). Data collection is conducted through an online survey platform to enable a broad reach and efficient response retrieval. Ethical considerations—including anonymity, voluntary participation, and informed consent—are strictly observed throughout the data-gathering process. Responses are screened to remove incomplete or inconsistent entries, ensuring data quality and integrity.

Data analysis is performed using Structural Equation Modeling (SEM), which allows simultaneous examination of multiple relationships between latent variables. SEM is suitable for this study due to its ability to assess both measurement and structural models, ensuring a rigorous evaluation of reliability, validity, and causal paths. The analysis includes descriptive statistics, reliability tests (Cronbach’s alpha and composite reliability), validity assessments (convergent and discriminant validity), and hypothesis testing through path analysis. Model fit is evaluated using established fit indices such as CFI, RMSEA, and SRMR. Findings from the analysis are used to interpret the strength and significance of each predictor variable in determining consumer adoption of sustainable finance services, providing empirical support for theoretical assumptions and practical recommendations.

4. Results and Discussion

4.1. Descriptive Statistics

The descriptive analysis provides an overview of respondents’ perceptions regarding green financial literacy, sustainable awareness, green banking products, regulatory support, and adoption of sustainable finance services. The means, standard deviations, and ranges of the constructs are presented to understand the general tendencies of the respondents.

Table 1. Descriptive Statistics

Variable	N	Mean	Std. Dev
Green Financial Literacy (GFL)	250	4.112	0.652
Sustainable Awareness (SA)	250	4.230	0.598
Green Banking Products (GBP)	250	3.945	0.701
Regulatory Support (RS)	250	4.001	0.634
Adoption of Sustainable Finance (ASF)	250	3.872	0.687

Source: Data Processed

The results indicate that respondents generally have high levels of green financial literacy and sustainable awareness, with mean values above 4.0. Perceptions of green banking products and regulatory support are slightly lower but still above the midpoint of 3.0, while adoption of sustainable finance services shows a moderate tendency. This suggests that while

consumers are aware and knowledgeable, actual adoption remains slightly lower, highlighting potential gaps in translating knowledge and awareness into behavior.

4.2. Reliability and Validity Analysis

To ensure the measurement instruments are reliable and valid, Cronbach’s alpha, composite reliability (CR), and average variance extracted (AVE) were assessed. These metrics confirm whether the constructs consistently measure the intended variables and whether they exhibit convergent and discriminant validity.

Table 2. Reliability and Validity

Construct	Cronbach’s Alpha	Composite Reliability (CR)	AVE
Green Financial Literacy (GFL)	0.884	0.911	0.658
Sustainable Awareness (SA)	0.862	0.895	0.642
Green Banking Products (GBP)	0.875	0.902	0.651
Regulatory Support (RS)	0.849	0.887	0.634
Adoption of Sustainable Finance (ASF)	0.871	0.903	0.657

Source: Data Processed

All constructs exhibit Cronbach’s alpha and CR values above 0.8, indicating strong internal consistency. The AVE values are above 0.6 for all constructs, confirming adequate convergent validity. These results suggest that the measurement instruments are both reliable and valid for further structural analysis.

4.3. Correlation Analysis

Correlation analysis was conducted to examine the strength and direction of relationships between the variables before SEM analysis. Positive correlations are expected, as suggested by the literature.

Table 3. Correlation Matrix

Variable	GFL	SA	GBP	RS	ASF
GFL	1.000				
SA	0.624	1.000			
GBP	0.592	0.611	1.000		
RS	0.548	0.573	0.599	1.000	
ASF	0.667	0.681	0.653	0.604	1.000

Source: Data Processed

All variables are positively correlated, with coefficients ranging from 0.548 to 0.681. Green financial literacy and sustainable awareness show the strongest correlations with the adoption of sustainable finance, suggesting that knowledge and awareness are key drivers. The positive correlations among all constructs also indicate potential multicollinearity, which SEM can account for when evaluating direct and indirect effects.

4.4. Structural Equation Modeling (SEM) Results

The structural model was tested to determine the direct effects of GFL, SA, GBP, and RS on ASF. Model fit indices indicated a good fit (CFI = 0.955, RMSEA = 0.048, SRMR = 0.041). The standardized path coefficients and significance levels are shown in the following table:

Table 4. SEM Path Coefficients

Path	Standardized Coefficient (β)	SE	t-value	p-value
GFL \rightarrow ASF	0.321	0.056	5.732	0.000
SA \rightarrow ASF	0.289	0.052	5.558	0.000
GBP \rightarrow ASF	0.247	0.049	5.041	0.000
RS \rightarrow ASF	0.203	0.045	4.511	0.000

Source: Data Processed

The SEM results indicate that all four independent variables significantly influence the adoption of sustainable finance services. Green financial literacy has the strongest effect ($\beta = 0.321$), followed by sustainable awareness ($\beta = 0.289$), green banking products ($\beta = 0.247$), and regulatory support ($\beta = 0.203$). The results confirm the theoretical assumption that both individual knowledge and institutional support play critical roles in shaping consumer behavior toward sustainable finance.

4.5. Discussion

1) Role of Green Financial Literacy

The analysis reveals that green financial literacy has the strongest direct effect on the adoption of sustainable finance services ($\beta = 0.321$, $p < 0.001$). This finding emphasizes that consumers' knowledge about environmentally friendly financial products, investment instruments, and associated risk–return trade-offs is a critical enabler of sustainable finance adoption. The result is consistent with earlier studies suggesting that financial literacy enhances consumer confidence and empowers individuals to make informed decisions regarding green investments (Hettige et al., 2024; Hidayat-ur-Rehman & Hossain, 2025; Huong, 2024; Khan et al., 2025).

From a theoretical perspective, the significant role of GFL aligns with the Theory of Planned Behavior (TPB), which posits that perceived behavioral control (largely determined by knowledge and competence) influences behavioral intentions and subsequent action (Ajzen, 1991). Consumers who understand the mechanics of green bonds, sustainable loans, and investment funds are more likely to perceive themselves as capable of participating in sustainable finance, thereby increasing adoption rates.

Practically, this finding underscores the importance of integrating financial education programs that focus on sustainable finance. Banks, financial institutions, and regulators can develop targeted training, workshops, and online courses to enhance public understanding of green finance. Such initiatives not only empower consumers but also help institutions expand their customer base for sustainable products, contributing to the growth of the sustainable finance market

2) Influence of Sustainable Awareness

Sustainable awareness also exhibits a significant and positive effect on the adoption of sustainable finance services ($\beta = 0.289$, $p < 0.001$). This indicates that consumers' environmental consciousness, knowledge of ecological impacts, and value-driven motivations are essential in shaping financial behavior. Awareness fosters a sense of responsibility, prompting individuals to align their financial decisions with environmental objectives. The findings corroborate previous studies that argue environmentally aware

consumers are more likely to engage in eco-friendly financial practices (Hidayat-ur-Rehman, 2025; Shokeen, 2025).

The interaction between awareness and adoption behavior highlights the psychological mechanisms influencing consumer decisions. Awareness shapes attitudes and behavioral intentions, acting as a cognitive precursor to action. This aligns with TPB and value-belief-norm theories, which suggest that awareness leads to pro-environmental norms and ethical motivations that influence actual behavior (Bouma et al., 2017). However, the slightly lower effect compared to GFL suggests that knowledge alone is more instrumental than awareness in driving adoption, emphasizing the need for integrated strategies combining education and awareness campaigns.

For practitioners, the findings imply that sustainable finance adoption can be enhanced through public awareness campaigns, environmental reporting, and community engagement programs. Financial institutions could collaborate with NGOs, schools, and media to disseminate information about the environmental and social impact of sustainable finance, fostering a culture where consumers consider ecological consequences in their financial decisions.

3) Impact of Green Banking Products

Green banking products also positively influence adoption ($\beta = 0.247$, $p < 0.001$), indicating that the availability and design of sustainable financial instruments are crucial in translating knowledge and awareness into tangible action. This supports the idea that while consumers may possess the motivation and awareness, actual adoption is contingent on the practical accessibility of products. The result is consistent with studies highlighting that product characteristics (such as simplicity, transparency, and perceived usefulness) directly affect consumer uptake (Hussain et al., 2024).

From a theoretical standpoint, the influence of GBP can be interpreted through the Technology Acceptance Model (TAM), where perceived ease of use and perceived usefulness determine adoption behavior (Davis, 1989; Suh & Ahn, 2021). User-friendly financial products, clearly explained and visibly aligned with sustainability goals, reduce cognitive and perceived barriers, facilitating adoption. Moreover, trust in the financial institution and the product itself also enhances uptake, especially in contexts where greenwashing or skepticism may exist (Meng & Khoo, 2020).

For policymakers and banks, these findings stress the importance of product innovation and transparency. Designing user-centric green financial products, coupled with clear communication about their environmental impact, can significantly increase consumer adoption. Institutions should also integrate digital platforms to simplify access, making sustainable finance more convenient and appealing to tech-savvy consumers.

4) Significance of Regulatory Support

Regulatory support is another significant predictor of adoption ($\beta = 0.203$, $p < 0.001$), albeit with a slightly lower effect than personal knowledge or product-related factors. Regulatory frameworks, including ESG disclosure requirements, tax incentives, and green finance roadmaps, create an enabling environment that promotes confidence and reduces perceived risks associated with sustainable financial services (Jain et al., 2025; Johri & Singh, 2024; Makorere, 2025). These findings suggest that regulatory support serves as an institutional safeguard, complementing individual and market-level factors.

The results align with institutional theory, which posits that regulatory mechanisms shape organizational behavior and market practices by establishing norms and rules (Scott, 2014). Consumers are more likely to trust and adopt green finance products in regions with consistent, transparent, and enforceable regulatory frameworks. Conversely, weak or inconsistent regulations may limit the effectiveness of other interventions, such as awareness campaigns or product innovations, highlighting the interdependent nature of factors influencing adoption.

For practical implications, policymakers must prioritize clear and enforceable regulations, coupled with incentives that encourage both consumers and financial institutions to participate in sustainable finance. Public-private partnerships, monitoring mechanisms, and consumer protection policies are critical to ensure credibility and maintain long-term adoption rates.

5) Theoretical and Practical Contributions

The study makes several contributions. Theoretically, it reinforces the applicability of TPB, TAM, and institutional theory in the context of sustainable finance, demonstrating that adoption is influenced by both individual-level cognition and external institutional support. Practically, the study provides actionable insights for banks, regulators, and policymakers seeking to promote sustainable financial behavior. By emphasizing the combined role of literacy, awareness, product design, and regulation, the findings suggest targeted strategies for enhancing market penetration and fostering a culture of sustainability in financial decision-making.

6) Limitations and Future Directions

Despite its contributions, this study has some limitations. First, the use of a cross-sectional survey design limits the ability to infer causal relationships over time. Future research could employ longitudinal studies to track changes in adoption behavior. Second, the study focuses on a specific regional sample, which may limit generalizability. Comparative studies across countries with differing regulatory frameworks and cultural contexts would provide broader insights. Finally, while the study considers four major factors, other variables such as social influence, technological readiness, and perceived behavioral control could be explored in future research to enhance predictive accuracy.

5. Conclusion

This study demonstrates that green financial literacy, sustainable awareness, green banking products, and regulatory support play significant and complementary roles in shaping consumer adoption of sustainable finance services. Among these factors, green financial literacy emerged as the strongest driver, highlighting the critical importance of knowledge and understanding in enabling informed financial decisions. Sustainable awareness, accessible green banking products, and supportive regulatory frameworks also positively influence adoption, underscoring the need for a holistic approach that integrates individual capabilities, product availability, and institutional support. Collectively, these findings emphasize that promoting sustainable finance requires coordinated efforts by financial institutions, policymakers, and educators to enhance literacy, raise awareness, design user-friendly products, and ensure credible regulations. By addressing these interconnected factors,

stakeholders can foster greater consumer engagement, drive the growth of sustainable finance markets, and contribute to broader environmental and economic sustainability goals.

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