

Sustainable Finance in Banking: Modeling the Influence of Policy Frameworks and ESG Integration on Green Lending and Transition Outcomes

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Abstract: This paper discusses the relationship between sustainable finance in the banking industry and how regulatory requirements and integration of ESG can be directly translated into tangible transition results. Based on the literature of institutional theory and sustainable finance, the study develops and experiments the structured transmission framework connecting the policy frameworks, ESG integration, green lending, and sustainable transition outcomes. The study examines both direct and mediated correlations between the constructs using cross-sectional survey data on 214 banking professionals using a 'Partial Least Squares Structural Equation Modeling (PLS-SEM)'. It is found that the policy frameworks are the main institutional driver that has a strong impact on ESG integration and green lending practices. ESG integration has a positive impact on green lending, and no direct impact on transition outcomes, which means that governance embedding is not enough to achieve measurable sustainability outcomes. Green lending seems to be the key operational tool, which has a powerful and considerable impact on the outcomes of transitions. The mediation analysis proves that ESG integration only leads to the sustainability performance when converted into climate-aligned credit allocation. The findings take a sustainable finance transmission viewpoint, which shows that regulatory pressure, governance mechanisms, and financial intermediation exist in a sequential manner to determine low-carbon transition performance. The research paper adds to the theory by taking institutional accounts to operational banking behavior and offers practical implications to regulators and banking managers wishing to hasten net-zero finance approaches.

Keywords: Sustainable Finance, Green Lending, ESG Integration, Banking Sector, Climate Risk, Sustainable Banking

1. Introduction

The concept of sustainable finance has progressed as a peripheral ethical issue to a strategic focus point in the banking industry (Ahlström and Monciardini, 2021). The banks are very determinant in the economic development in terms of lending, making investments, and risk management (Gjelsvik, 2017). Being financial intermediaries, they affect the sectors growing, changing, or shrinking, by directing capital flows (Azolibe, 2021). As the issue of climate change, environmental degradation, and social inequality have been identified as material financial risks, the incorporation of sustainability factors into the banking activity has become both vital and non-dispersive (Kus and Jackson, 2025; Migliorelli, 2023). Green lending, sustainability-linked financial products, climate risk assessment, and portfolio strategies that align with ESG are now included in sustainable finance in banking (Vitoh,

2025). Such developments indicate a shift in the structure of banks in valuing long-term value creation and systemic risk.

However, over the last few years, regulations have triggered a rapid shift towards climate-compatible financial systems (D'Orazio, 2025). Green taxonomies, compulsory sustainability disclosures, stress testing, and sustainable finance are new measures introduced by central banks, supervisory authorities, and international bodies of standards (García-Torea et al., 2024). All these policy frameworks are meant to increase transparency and reduce systemic risk and to redirect financial flows to activities that are environmentally and socially responsible (Battaglia et al., 2025). The area of financial supervision has been widened by regulatory intervention to cover climate-related risk governance, whereby banks are obligated to integrate sustainability in fundamental strategic

procedures (Demekas & Grippa, 2022). Although these kinds of policy measures are becoming more common, the processes of how a regulatory pressure can be converted into tangible green lending practices and quantifiable outcomes of transitions are still understudied (Larsen, 2022; Monasterolo et al., 2024).

In this regulatory background, ESG integration has become an important internal governance process (Guan et al., 2026). ESG integration is the process of incorporating environmental, social, and governance elements into financial building credit policies and portfolio risk management and strategically (Landi et al., 2022; Saviano et al., 2024). It is an indication of how the principles of sustainability have been institutionalized in decision-making structures. With regard to the banking domain, a successful ESG implementation determines loan approval processes, exposure-related choices, and the risk-associated capital provision (Erdoğan et al., 2025). Nevertheless, the ESG integration might not directly produce sustainable transition outcomes unless it has a significant impact on the lending behavior (Fernández-Muro & Casalegno, 2025). The question of whether ESG is a direct motivation of transition performance or it would work through the green lending practices is an empirical question that would be the subject of systematic research (Shi & Yao, 2025). Regardless of the recent upward trend in the academic interest toward sustainable finance, there are still major gaps in the literature (Debrah et al., 2022; Kumar et al., 2022). The current research tends to assess policy frameworks, ESG integration or green lending separately without interrelationship modeling within a single structural framework. In addition, empirical studies seldom attempt to establish the sequential relationships between institutional pressures and transition outcomes by using governance and financial processes. This leads to the underdevelopment of the transmission architecture of sustainable finance in banking. It is not very clear whether policy frameworks have a direct impact on sustainability outcomes or the effects that policy frameworks have are mediated by ESG integration and green lending channels.

This research will fill in these gaps by formulating and empirically testing a '*structural model*', which explains the impact of policy regimes on sustainable results of transition in banking sector. Particularly, the study will examine the role of regulatory drivers in shaping ESG integration, the role of ESG integration in the practice of green lending and the role of green lending in transition outcomes that are measurable. The research also explores the mediation processes which relate institutional pressures with sustainability performance in banks and as such it provides a complete explanation of the dynamics of sustainable finance.

Against these aims, the research questions that guide the study are as follows:

RQ1: What is the impact of policy frameworks on the integration of ESG in the banks?

RQ2: How does the policy framework and integration of ESG influence the green lending practices?

RQ3: Does green lending have a significant effect on the outcomes of sustainable transition in the banking sector?

RQ4: Do ESG integration and green lending mediate the association between policy frameworks and transition performance?

The research will contribute to the development of the theory by answering these questions and it will help to understand the governance-to-finance transmission mechanism in the banking industry. It can also offer concrete lessons to regulators interested in enhancing the efficacy of their policies and banking managers interested in making their lending policies and strategies more sustainable. The rest of the paper continues with the review of the related literature and formulation of the hypothesis, then the methodology, empirical findings, discussion, and final suggestions of theoretical and practical implications.

2. Literature Review and Hypothesis Development

2.1. Policy Frameworks and Sustainable Banking

The policy frameworks are the main institutional forces that influence sustainable banking practices (Siddik et al., 2023; Tandan et al., 2025; Vitoh,

2025). Banks react to regulatory actions that ensue as a result of the supervisory authorities, industry norms, and global sustainability standards that have their basis in the institutional theory (Ferretti et al., 2024; Kim et al., 2024). Climate-related disclosure requirements, green taxonomies, sustainability reporting, and environmental risks guidelines force banks to introduce sustainability in the governance framework and risk management platforms (Brinkman, 2023; Fedele et al., 2025; Ngo et al., 2022). With the increase in regulatory expectations, ESG considerations get integrated into the strategic and operational decision-making (Annesi et al., 2024).

In addition to the alignment of governance, the policy frameworks have a direct effect on lending behavior. The banks are encouraged to use credit on environmentally friendly projects through sustainable finance requirements, industry lending policies, and green financing requirements (Dikau and Volz, 2021; Setyowati, 2020). The regulatory clarity lessens the uncertainty of the sustainable investments as well as enhances the business motivation of green lending (Alhejaili, 2024; García-Torea et al., 2024; Ning and Shen, 2024). In addition to that, the regulatory interventions can also be directly related to transition outcomes, as they can improve transparency and shift financial flows to the low-carbon industries (Monasterolo et al., 2024; Zhang et al., 2024). In this respect, the policy frameworks are likely to affect the integration of ESG, green lending and sustainable transition results in direct and indirect ways.

It is on this theoretical basis that the hypothesis below is put forward:

H1: Policy Frameworks positively influence ESG Integration in banks.

H2: Policy Frameworks positively influence Green Lending practices.

H6: Policy Frameworks positively influence Sustainable Transition Outcomes.

2.2. ESG Integration as Governance Mechanism

ESG integration is a system of governance mechanism, which incorporates the issue of sustainability into the very fabric of banking

(Giorgio et al., 2025; Jan et al., 2022; Sengupta et al., 2023). It is an indication of consideration of the environmental, social, and governance issues in board management, credit assessment procedures, and risk management models (Landi et al., 2022). There is a set of ESG principles that affect strategic planning, portfolio allocation and capital deployment decisions in banks when put together in a systematic manner (Ferretti et al., 2024; Mirza et al., 2025).

Regarding risk management, ESG integration empowers the identification and mitigation of climate-related, social and reputational risks that have the potential to upgrade financial stability (Billio et al., 2024). With the changing supervisory demands, banks are aligning the lending standards with the sustainability standards more often (Conley and Williams, 2011; Costa and Pillo, 2024; Méndez and Houghton, 2020). In turn, the integration of ESG will have a positive effect on the green lending practice through the alignment of the credit allocation with the sustainability goals (Mirza et al., 2025; Saviano et al., 2024). Nonetheless, its direct impact on transition results has not been well researched as quantifiable sustainability performance could be contingent upon the existence of ESG promises in the form of actual lending choices.

According to this argument, the following hypotheses can be proposed:

H3: ESG Integration positively influences Green Lending practices.

H4: ESG Integration positively influences Sustainable Transition Outcomes.

2.3. Green Lending and Transition Outcomes

Green lending is the channel of operation by which banks transform the sustainability promises into economic reality (Aslam & Jawaid, 2022; Zhang et al., 2022). Banks have a direct effect on the rate and course of climate change by lending money to renewable energy solutions, low-carbon infrastructure, sustainable industries, and eco-friendly businesses (Campiglio, 2015). Green lending has an impact on real economic activity, unlike internal operating governance reforms that

determine which sectors will receive financial backing and which business models will be increased (Gabor and Braun, 2025; Hunjra, 2025; Luo and Cheng, 2022).

The decision on the allocation of credit is an important factor that facilitates net-zero pathways (Fankhauser et al., 2023). By focusing on environmentally oriented projects and considering the impacts of climate risks in lending policies, banks will minimize their exposure to carbon-intensive industries and will increase capital flows to sustainable solutions (Colenbrander et al., 2022).

2.4. Conceptual Model

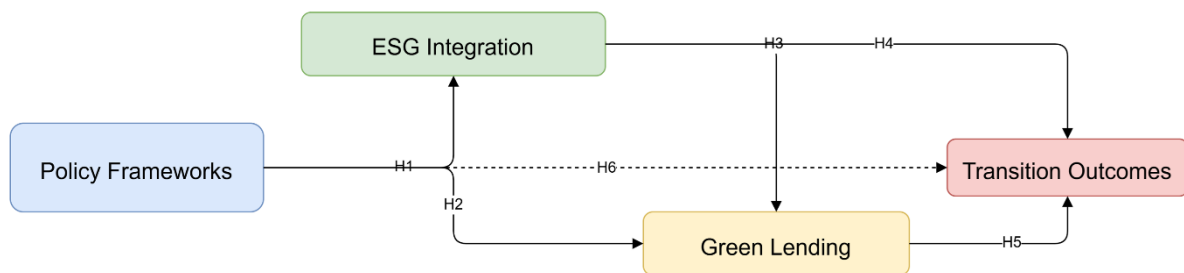


Figure 1: Conceptual Framework

The ‘conceptual model’ describes the role of regulatory, governance, and financial mechanisms in ensuring sustainable transition outcomes in the banking industry. Policy Frameworks have been placed at the top in terms of the external driver touching on ESG Integration and Green Lending. The close regulatory requirements will be likely to improve the ESG governance among banks (H1) and to directly promote the green lending practices (H2). A pathway between Policy Frameworks and Transition Outcomes (H6) direct is also provided to test the hypothesis on whether regulation alone brings about sustainability performance. ESG Integration is an internal control process that influences lending decisions. It is postulated that it positively changes Green Lending (H3) and possibly that it directly impacts Transition Outcomes (H4). Green Lending acts as the main working pathway that sustainability promises are converted into quantifiable results, and is anticipated to impact positively Transition Outcomes (H5). In general, the model is able to sum up direct and indirect

Banks have the ability to become the drivers of low-carbon investment and structural economic change through sustainable lending products and green bonds, as well as climate-related financing mechanisms (Han et al., 2025).

In this regard, green lending is projected to possess direct and substantial impact on sustainable transition outcomes, since it is through financial intermediation that the banking strategy will have an outcome of net-zero net result.

H5: Green Lending positively influences Sustainable Transition Outcomes.

mechanisms between regulation and sustainable transition performance in the banking sector.

3. Research Methodology

3.1. Research Design

The paper takes the form of a cross-sectional survey to explore the linkages between policy frameworks, ESG integration, the green lending practice, and the transition outcomes in the banking industry. The study used a single-point-in-time set of data on banking professionals enabling the data to encompass up-to-date perceptions and practices regarding sustainable finance. The study requires a cross-sectional design: it is necessary to conduct testing of structural relationships, the mediation effects in a specific organizational environment.

The study adheres to a quantitative research methodology since the aim is to empirically attempt to test hypothesized relations via measurable constructs. An ordered questionnaire was designed in accordance with known literature and was consistent with the conceptual model. The measurement of responses was on a Likert-type

scale to guarantee consistency and comparison in constructs.

The '*Structural Equation Modeling (SEM)*' was used as the main method of analysis because it is capable of measuring the measurement validity and structural relationships between latent variables at the same time. SEM allows assessing direct, indirect, and overall impacts, which is why it is especially effective in analyzing the mediation channels in the framework of sustainable finance proposed. The proposed methodology will guarantee a strict test of the conceptual model and give sound information about the transmission processes that work in the field of sustainable banking.

3.2. Sample and Data Collection

The research focused on the banking professionals who are directly engaged in the sustainability, risk management, credit appraisal and strategic decision making processes. The sample was made up of ESG officers, risk managers, credit managers, finance executives and senior banking executives. The

above people were picked due to their knowledge of both policy compliance, ESG integration practice, and green lending activity in their respective institutions.

The purposive sampling method was used to make sure that the participants had the required knowledge and work experience in the area of sustainable finance. Banks in the public, private and foreign sectors were contacted with the aim of increasing the level of representation and variability in the sample. The questionnaire was sent out electronically to the selected respondents and they were provided with a concise brief statement about the purpose of the study and were assured of confidentiality.

The questionnaires were sent to 245 participants, and usable responses were obtained (214 of them), and the response rate was 87.35. All valid responses were then retained to undergo analysis after completeness and consistency screening. The sample size obtained meets the desired requirements of Structural Equation Modeling and has the necessary power to test the hypotheses set.

Table 1: Sample Characteristics (N = 214)

Variable	Category	Frequency	Percentage (%)
Gender	Male	138	64.5
	Female	76	35.5
Age Group	Below 30 years	42	19.6
	30–39 years	86	40.2
	40–49 years	61	28.5
	50 years and above	25	11.7
Educational Qualification	Bachelor's Degree	54	25.2
	Master's Degree	137	64.0
	Doctorate / Professional Certification	23	10.8
Bank Type	Public Sector Bank	102	47.7
	Private Sector Bank	88	41.1
	Foreign / International Bank	24	11.2
Years of Experience	Less than 5 years	39	18.2
	5–10 years	74	34.6
	11–20 years	69	32.2
	More than 20 years	32	15.0
Current Position	ESG / Sustainability Officer	48	22.4
	Risk / Credit Manager	72	33.6
	Finance / Investment Manager	56	26.2
	Senior Executive / Director	38	17.8

Source: Prepared by Author

The sample will include 214 banking professionals of the varying demographic and professional backgrounds. Most of the respondents were male

(64.5%); the women were 35.5% within the industry, which shows that there is moderate gender representation in the industry. The majority of the

respondents were aged 30 to 39 years (40.2%), which was then followed by people aged 40 to 49 years (28.5%), indicating that the sample has mostly comprised of middle career professionals that have substantial exposure to the industry.

Regarding the level of education, the percent of individuals who had a masters degree (64) was large, indicating high degree of academic preparedness to work in a financial and sustainability position. The respondents were almost evenly represented in that almost half of the respondents constituted public sector banks (47.7%), and the other half belonged to the private sector banks (41.1). Most of the respondents had over five years of professional experience with 34.6 and 32.2 years of experience reporting 5-10 and 11-20 years of experience respectively. When it comes to functional roles, the respondents mostly were risk or credit managers (33.6%), then finance or investment managers (26.2%), ESG officers (22.4%), and senior executives (17.8%). On the whole, the sample represents the cohort of seasoned banking professionals who are in a position to share knowledgeable views on the topics of ESG integration and green lending.

3.3. Measurement Development

The measurement scale was created to reflect the most significant constructs of the proposed sustainable finance framework which are Policy Frameworks, ESG Integration, Green Lending, and

Transition Outcomes. The scale design was based on the standard practices of a quantitative research design, and it was clear in terms of the conceptual clarity, content validity, and consistency with the theoretical model. Every construct was operationalized in form of a reflective latent variable and it had more than one indicator, meant to capture underlying perceptions and practices in banks.

The items were based on the previous literature on sustainable finance, ESG governance, green banking and climate-aligned financial systems, and it was narrowed to the banking environment. Where need be, the wording was altered in such a way that it is easy to understand and it is relevant to the context. Academic experts and banking professionals reviewed the questionnaire and provided an opportunity to improve its content validity so that items could be well-representative of the institutional, governance, and lending aspects of sustainable finance.

All answers were assessed through 'five-point Likert scale' that had '1 (Strongly Disagree) to 5 (Strongly Agree)'. This format has been chosen because it allows consistency in responses, better comparability among constructs and this allows a powerful analysis using structural equation modeling. The Likert scale design can be used to measure the perceived level of intensity and degree of agreement, which is suitable in investigating the governance processes and sustainability behaviour in the banking institutions.

Table 2: Construct Operationalization

Construct	Type of Outer Model	No. of Indicators	Questionnaire Items
Policy Frameworks (PF)	Latent Variable (Mode A – Reflective)	8	PF1: Regulatory policies strongly influence our bank's sustainability strategy. PF2: Climate-related disclosure mandates affect our internal governance practices. PF3: Green taxonomy standards guide our lending decisions. PF4: Sustainable finance guidelines influence credit risk assessment. PF5: Environmental regulations shape capital allocation priorities. PF6: Supervisory expectations encourage integration of climate risk. PF7: Government incentives support sustainable lending initiatives. PF8: Regulatory clarity reduces uncertainty in green financing decisions.

ESG Integration (ESGI)	Latent Variable (Mode A – Reflective)	4	ESGI1: ESG criteria are integrated into our credit evaluation processes. ESGI2: The board actively oversees sustainability performance. ESGI3: Environmental and social risks are embedded in risk management systems. ESGI4: ESG considerations influence long-term strategic planning.
Green Lending (GL)	Latent Variable (Mode A – Reflective)	4	GL1: Our bank actively finances environmentally sustainable projects. GL2: Green loan products form a significant part of our portfolio. GL3: Lending decisions prioritize low-carbon and sustainable sectors. GL4: Climate risk considerations affect sectoral credit allocation.
Transition Outcomes (TO)	Latent Variable (Mode A – Reflective)	4	TO1: Our lending practices contribute to net-zero transition goals. TO2: The bank supports sustainable economic transformation through credit allocation. TO3: Our financing activities reduce exposure to carbon-intensive sectors. TO4: Green lending has improved measurable sustainability performance.

Source: Prepared by Author

Construct operationalization is an example of a structured and theory-based measurement framework that can be used to analyze SEM. Policy Frameworks (PF) is operationalized with eight indicators that measure regulatory pressure, disclosure requirements, supervisory expectations and policy clarity hence the symbol of the institutional motives determining sustainable banking practices. The measure of ESG Integration (ESGI) is in the form of four indicators that deal with governance oversight, risk management embedding, and strategic alignment, which indicates the internalization of sustainability in banking operations.

Green Lending (GL) is measured in terms of four items that evaluate climate oriented credit provision and environment oriented financing provision decisions, and this is the operating channel in which sustainability pledges are executed. Transition Outcomes (TO) are assessed based on four indicators which assess the input of the bank towards net-zero goals, sustainable economic change, and lower the exposure of the bank to carbon-intensive sectors. On the whole, the measurement framework

displays a conceptual consistency, and every construct is a clear reflection of a different phase of the sustainable finance transmission process.

3.4. Data Analysis Procedure

Analysis of the data was carried out under the '*Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software*'. The reason why this method was selected is that it is suitable in testing complicated relationships and mediation between latent constructs.

The analysis was done in two phases. To start with, the measurement model was tested on the basis of assessing '*reliability and validity in Cronbach-alpha*', '*composite, average variance extracted (AVE)*', and '*discriminant validity*'. Second, '*structural model*' was evaluated through the examination of path coefficients, R^2 , effect sizes and model fit (SRMR).

In order to determine the significance of any given relationships that were hypothesized, a bootstrapping analysis (5,000 resamples) was carried out, which produced both t-value and p-value of the direct and indirect effects.

4. Results

4.1. Descriptive Statistics

Table 3: Descriptive Statistics

Indicator	Minimum	Maximum	Mean	Variance	Skewness	Kurtosis
PF1	1	5	2.74766355	2.34917292	0.21089144	-1.44343062
PF2	1	5	2.8317757	2.26264754	0.15629011	-1.4113712
PF3	1	5	2.85981308	2.20560748	0.06968711	-1.40927805
PF4	1	5	2.91588785	2.27458207	0.04473359	-1.4333048
PF5	1	5	2.73831776	2.24106007	0.2013988	-1.39269134
PF6	1	5	2.8411215	2.23754991	0.1557823	-1.39957266
PF7	1	5	2.8411215	2.12487385	0.09575293	-1.35171955
PF8	1	5	2.92523364	2.26668422	0.02830452	-1.4243464
GL1	1	5	2.80373832	2.48712211	0.21208305	-1.48683385
GL2	1	5	2.87850467	2.3419771	0.15894419	-1.42610616
GL3	1	5	2.96261682	2.25211706	0.04740777	-1.4193973
GL4	1	5	2.98130841	2.40340485	0.03142581	-1.49047876
ESGI1	1	5	2.61682243	2.43464525	0.37196281	-1.40560255
ESGI2	1	5	2.75700935	2.36321355	0.25830249	-1.42286802
ESGI3	1	5	2.82242991	2.32512834	0.15909743	-1.46650868
ESGI4	1	5	2.80373832	2.41200474	0.19496764	-1.47234649
TO1	1	5	2.89719626	2.64665877	0.07494993	-1.61554648
TO2	1	5	3	2.38497653	-0.04632065	-1.49082626
TO3	1	5	3.03738318	2.19577904	-0.0298056	-1.37298219
TO4	1	5	3.02803738	2.35601773	-0.06318463	-1.4550167

Source: Prepared by Author

The descriptive statistics show that all measures on all the indicators were done on a 'five-point Likert scale' with the lowest and highest values on the measures being between 1 and 5. The average of the majority of the items is 2.6 to 3.0, which indicates that there is a moderate perception of the respondents in terms of policy influence, ESGs integration, green lending practices, and transition outcomes. Transition Outcome indicators (TO2, TO3, TO4) demonstrate a little higher mean and this

suggests a rather good agreement on the contribution of sustainable performance.

The values of variance are also fairly consistent with items giving evidence to the consistency of responses distribution. The values of skewness are near zero indicating that the data is approximately symmetric, whereas the values of kurtosis are negative in all indicators indicating that the data is slightly flatter than normal.

4.2. Measurement Model Assessment

4.2.1. Reliability and Convergent Validity

Table 4: Reliability and Convergent Validity

Construct	No. of Indicators	Cronbach's Alpha (α)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Policy Frameworks (PF)	8	0.9762	0.9811	0.8380
ESG Integration (ESGI)	4	0.9575	0.9698	0.8503
Green Lending (GL)	4	0.9534	0.9674	0.8371
Transition Outcomes (TO)	4	0.9413	0.9597	0.8005

Source: Prepared by Author

The results of '*reliability and convergent validity*' show that the measurements of all constructs are of good quality. All constructs have values of alpha greater than the recommended value of 0.70 and this reflects the good internal consistency. The '*composite reliability values*' as well are greater than 0.70 which approves the strength and stability of the measurement model.

'*Convergent validity*' is determined when the values of '*Average Variance Extracted (AVE)*' of all the constructs are very high than the minimum value of 0.50. This shows that, both constructs identify a high percentage of variance in their indicators. In general, it can be stated that the measurement model has high levels of reliability and acceptable levels of convergent validity, which prove its applicability to '*structural model*' analysis.

4.2.2. Discriminant Validity

Table 5: Discriminant Validity Assessment

Table 5 A: Discriminant Validity: Heterotrait-Monotrait Ratio of Correlations (HTMT)

Construct	PF	GL	ESGI	TO
PF				
GL	0.6653			
ESGI	0.6927	0.7181		
TO	0.7378	0.8205	0.687	

Table 5 B: Discriminant Validity: Heterotrait-Monotrait Ratio of Correlations (HTMT2)

Construct	PF	GL	ESGI	TO
PF				
GL	0.6637			
ESGI	0.6905	0.7155		
TO	0.7366	0.8179	0.6837	

Table 5 C: Discriminant Validity: Fornell-Larcker Criterion

Construct	PF	GL	ESGI	TO
PF	0.838			
GL	0.4425	0.8371		
ESGI	0.48	0.5156	0.8503	
TO	0.5437	0.6741	0.4722	0.8005

Source: Prepared by Author

Discriminant validity test provides an assurance that the constructs in the model are empirically different to each other. The values of HTMT reported in Table 5A and Table 5B are all less than the conservative figure (0.90) which represents satisfactory discriminant validity. This implies that the interrelations among various constructs are not so high and that both constructs indicate a distinct conceptual dimension of the sustainable finance framework.

On the same note, the '*Fornell-Larcker criterion*' in Table 5C is also another indicator of '*discriminant validity*'. The '*square root of the AVE of each construct (diagonal values)*' is greater than the inter-

construct correlations, which prove that each '*latent variable*' has more '*variance with its indicators*', compared to those of the other constructs in the model. In general, the findings of HTMT and HTMT2 and Fornell-Larcker criterion all prove that the measurement model meets the requirements of '*discriminant validity*', which supports the structural model analysis.

4.3. Structural Model Assessment

4.3.1. Model Fit Indicators

The '*standardized root mean square Residual (SRMR)*' was used to test the overall model fit. The SRMR of the '*saturated and estimated models*' was 0.0518 which is less than the recommended value of

0.08. This is a good fit to the model and it indicates that the data being observed is well presented by the proposed structure model.

Harman single-factor test was done to determine the possibility of 'Common Method Bias (CMB)'. The findings indicated that the former explained 48.92

4.3.2. Coefficient of Determination (R^2)

Table 6: R^2 and Predictive Power

Endogenous Construct	R^2	Adjusted R^2	Interpretation of Predictive Power
ESG Integration (ESGI)	0.480	0.4776	Moderate explanatory power
Green Lending (GL)	0.5697	0.5656	Moderate to substantial explanatory power
Transition Outcomes (TO)	0.7411	0.7374	Substantial explanatory power

Source: Prepared by Author

The 'coefficient of determination (R^2)' was tested to determine the strength of the structural model in predicting. R^2 values show the percentage of variance that each endogenous construct has been explained by its respective predictors.

According to the results, ESG Integration (ESGI) exhibits a value of $R^2 = 0.480$; this implies that Policy Frameworks explain 48 percent of the variance in ESG integration. This represents a moderate explanatory power. The value of R^2 of Green Lending (GL) is 0.5697, indicating a moderate to a significant degree of predictive power

4.3.3. Hypothesis Testing

percent of the overall variance, which is less than the critical value of 50. This shows that common method bias cannot be a severe issue in the study. In general, the model has decent fit and strength, which can prove the soundness of the structural relationships considered in the framework of sustainable finance.

by Policy Frameworks and ESG Integration together in explaining the variation in the green lending behaviors. Most significantly, Transition Outcomes (TO) have a R^2 value of 0.7411, which means that Policy Frameworks, ESG Integration, and Green Lending explain 74.11 percent of transition outcomes variance. This denotes a lot of explanatory power.

All in all, the R^2 values support the fact that the model has high predictive potential especially in explaining sustainable transition outcomes in the banking sector.

Table 7: Structural Path Results

Hypothesis	Structural Path	Standardized Coefficient (β)	t-value	p-value	Effect Size (f^2)	Decision
H1	PF $\rightarrow$ ESGI	0.6928	12.7157	< 0.001	0.9232	Supported
H2	PF $\rightarrow$ GL	0.3225	3.5885	< 0.001	0.1257	Supported
H3	ESGI $\rightarrow$ L	0.4946	5.1686	< 0.001	0.2956	Supported
H4	ESGI $\rightarrow$ O	0.0594	0.6076	0.5436	0.0055	Not Supported
H5	GL $\rightarrow$ TO	0.5655	5.2605	< 0.001	0.5315	Supported
H6	PF $\rightarrow$ TO	0.3201	3.3879	< 0.001	0.1828	Supported

Source: Prepared by Author

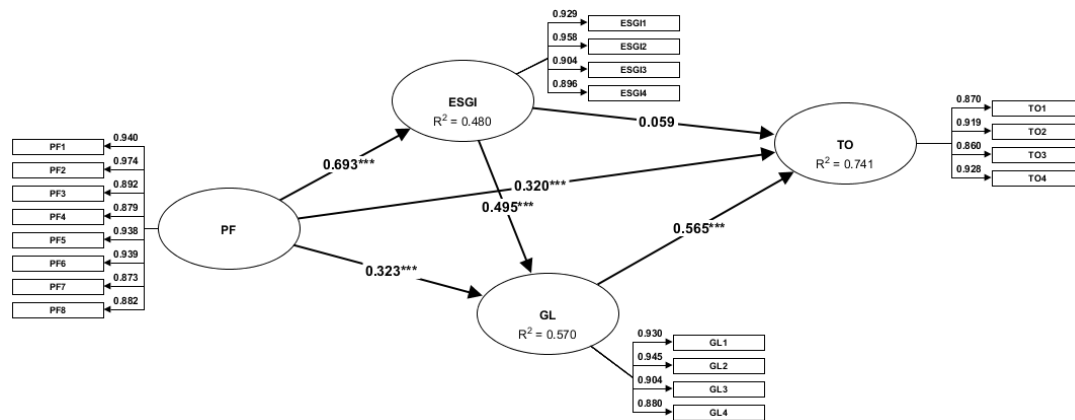


Figure 2: Structural Model with Standardized Path Coefficients

The results of the structural model show that there is a lot of support in most of the relationships that were hypothesized. The impact of Policy Frameworks on ESG Integration is significant ($b = 0.6928$, $p < 0.001$), thus it is a strong positive effect with large effect size ($f^2 = 0.9232$). This validates the fact that regulatory and institutional forces dominate the aspect of ESG governance in banks.

The impact of Policy Frameworks on Green Lending is very positive, namely ($b = 0.3225$), $p < 0.001$), but the effect size ($f^2 = 0.1257$) is moderate, which indicates that regulation requirements directly stimulate the provision of credit, which is climate-oriented. Likewise, ESG Integration plays a vital role in Green Lending ($b = 0.4946$, $p < 0.001$) which means that the internal governance mechanisms play a strong role in enhancing sustainable lending practices.

Nevertheless, the impact of ESG Integration on Transition Outcomes is not high ($b = 0.0594$, $p =$

0.5436), which justifies the rejection of H4. This implies that reforms in governance will not necessarily yield quantifiable sustainability results unless financial avenues are functional.

Green Lending has a highly powerful and 'significant impact' on Transition Outcomes ($b = 0.5655$, $p < 0.001$), and the effect size ($f^2 = 0.5315$) is quite substantial, which proves that sustainable transition performance is affected mostly by climate-aligned credit allocation. Further, Policy Frameworks also have a direct effect on Transition Outcomes ($b = 0.3201$, $p < 0.001$) which means that regulatory systems have both direct and indirect effect on sustainability outcomes.

In general, the results indicate that green lending serves as the focal point of transmission between regulatory models and ESG governance and the quantifiable effects of transition in the banking industry.

4.4. Mediation Analysis

Table 8: Indirect and Total Effects

Effect	Indirect Effect (β)	t-value	p-value	Total Effect (β)	Interpretation
PF $\rightarrow$ GL (via ESGI)	0.3427	4.7309	< 0.001	0.6652	Partial mediation
PF $\rightarrow$ TO (via ESGI & GL)	0.4173	5.1174	< 0.001	0.7374	Strong partial mediation
ESGI $\rightarrow$ TO (via GL)	0.2797	3.6335	< 0.001	0.3391	Full mediation

Source: Prepared by Author

The analysis of the mediation shows that the model has important indirect relationships. Policy Frameworks exert an indirect impact on Green Lending via ESG Integration ($b = 0.3427$, $p <$

0.001), which implies that it is partially mediated. This is an indication that regulatory frameworks affect green lending directly and indirectly through enhancing ESG governance mechanisms.

Likewise, the indirect impact of Policy Frameworks on Transition Outcomes via ESG Integration and Green Lending is also powerful ($b = 0.4173$, $p < 0.001$), and the overall impact is powerful ($b = 0.7374$). This implies a high degree of partial mediation, that is, the influence of regulation follows a variety of paths, and the mechanisms involved are governance embedding and credit allocation measures.

In the case of the ESG Integration, the indirect impact on Transition Outcomes through Green Lending is significant ($b = 0.2797$, $p < 0.001$), whereas the direct impact has been previously found to be insignificant. This substantiates the complete mediation whereby ESG integration can be deemed to be part of sustainable transition results when it is translated into tangible green lending behaviour. On the whole, the mediation findings support the main argument, that is, green lending is the most important transmission mechanism of the sustainable finance model.

5. Discussion

The results offer a logical explanation of the institutionalization of sustainable transition outcomes in the banking sector, facilitated by governance, and operationalized financially. These findings bring into sharp view the hierarchical and sequential character of sustainable finance processes in which regulative pressures influence the governance processes, governance also impacts the lending behaviour and finally, lending affects the performance of transition which can be measurable.

- **Policy Frameworks: As First in Institutional Motor.**

The findings affirm that the policy frameworks are the central institutional power that dictates the sustainable banking practice. The overwhelming impact of Policy Frameworks on ESG Integration and Green Lending proves that regulatory requirements, supervisory demands, and disclosure requirements based on climate play a significant role in shaping the internal governance arrangements and decision-making on credit allocation. This sustains institutional theory, which supports that organizations make internal structures consistent

with external regulatory pressure to achieve legitimacy and continuity of operations.

The existence of the large effect size of the relationship between Policy Frameworks and ESG Integration implies that the transformation of governance in banks is not voluntary but exists mostly as a result of compliance-based factor. Regulatory clarity, green taxonomies and climate risk-regulations seem to diminish uncertainty and encourage alignment in sustainability. Further, the large direct impact of Policy Frameworks on Transition Outcomes suggests that regulatory interventions can speed up sustainable finance results on top of internal governance processes. This is where the significance of the public policy to steer financial systems to climate-oriented goals becomes critical.

- **ESG Integration as an Internal Governance Channel.**

Even though, ESG Integration has a great impact on Green Lending, it does not have the direct impact on Transition Outcomes. This is a theoretically relevant finding. It may imply that the introduction of ESG principles in governance frameworks enhances an in-house control and risk-sharing process, yet the changes in the structure are not enough to drive quantifiable sustainability.

The implementation of ESG improves the climate risk assessment, sustainability oversight by the board, and alignment of strategic plans. Nevertheless, without operationalization of these governance mechanisms in terms of the lending and investment decisions, their effect is mostly procedural. This justifies the reason why the direct impact on the transition outcomes is not significant and supports the idea that the governance mechanisms have to be converted into the financial allocation behavior in order to have a practical change.

- **Green Lending as Intensive Transmission Mechanism.**

Green Lending becomes the most important working force of Transition Results. The robust and substantial relationship between Green Lending and Transition Outcomes validates the point that

climate-congruent credit provision represents the main means in which banks can have an impact on sustainable economic change. In contrast to governing as part of it, green lending has a direct impact on the investment patterns in the real sector, capital flows, and the restructuring of the sector.

This observation highlights the practicality of the involvement of banks in facilitating net-zero developments. Sustainable finance results are not the byproduct of policy adherence or reporting functions but are broadly established by way of capital distribution. Green loan portfolios, climate-linked financing instruments, and less exposure to carbon-intensive sectors seem to be the core of transition progress which can be measured.

- **Sequential Mediation Insights.**

The mediation analysis gives more insight on the transmission mechanism. The partial mediation demonstrated by the indirect impact of Policy Frameworks on the green lending via ESG Integration proves that regulatory pressure reinforces governance, which, in turn, contributes to the increase of green credit allocation. More to the point, the impact of Policy Frameworks on Transition Outcomes by both ESG Integration and Green Lending is a well-sequenced process.

Of particular interest is the entire mediating impact of ESG Integration on the Transition Outcomes through Green Lending. It implies that ESG governance can only help achieve sustainability when it is converted into lending decisions. That is, without reallocation of money to governance, efforts at governance reform have no real transition outcomes. This supports the theme of green lending being the core element of translating regulatory requirements with sustainability performance.

6. Theoretical Implications

This paper builds on the institutional theory by showing that the regulatory pressure in the context of sustainable finance does not just bring about a symbolic level of conformity but also brings about a structured level of governance and operational change in the bank. Previous studies focus on the development of paradoxical relationships between climate-related regulations and sustainability

reforms and compliance with substantive change (Ahlström & Monciardini, 2021). The current findings empirically confirm that policy frameworks play an important role in the integration of ESG and lending behavior, which points to the evidence that the supervisory role of banks is being remodelled by climate-aligned financial regulation (Alhejaili, 2024; Larsen, 2022). The paper demonstrates that the consequences of regulatory actions on transition outcomes are quite strong and direct and indirect, which contributes to the further development of the institutional theory beyond the legitimacy-seeking theory and places the regulatory systems as the sources of capital reallocation in banking as sources of structure.

One of the main theoretical contributions is to differentiate between ESG integration as an operational governance strategy and not a symbolic reporting practice. Although in previous research there is a debate on whether ESG practices are having substantive results (Fernandez-Muro and Casalegno, 2025) the results indicate that the integration of ESG has no direct outcome of transition. Rather, it affects fully via green lending. It is consistent with the studies on the inclusion of sustainability in risk management and strategy systems (Landi et al., 2022; Saviano et al., 2024). It is also an answer to the criticism that ESG can be seen as signaling instead of transformation that is driven by compliance (Annesi et al., 2024). The fact here indicated that ESG can only be effective when it is converted into capital allocation decisions. Therefore, one should think of ESG governance as a process of catalyzing the rearrangement of lending standards and financial flows, rather than reputational signaling.

The paper suggests a sustainable finance transmission model where institutional pressure, governance embedding and financial intermediation is incorporated into a sequential process. Expanding on the perspective of change theory of green finance (Monasterolo et al., 2024), the findings indicate the regulatory requirements have an impact on the governance systems, the governance affects lending behavior, and lending leads to observable transition outcomes. This ordered channel explains how economic efficiency conveys sustainability goals

into the economic metamorphosis done by its financial apparatuses. The results are in line with the literature that highlights the central role of banks in the process of financing low-carbon transitions (Campiglio, 2015; Colenbrander et al., 2022) and validate that allocating green credit may be considered as the working heart of sustainable finance. Besides, the high predictive capabilities of transition results imply that sustainable finance must be perceived as a macro-financial transmission process, but not separate practices of ESG compliance (Billio et al., 2024; Gabor and Braun, 2025).

This study adds to the existing theoretical framework with refined theoretical model by the empirical validation of sequential mediation effects, which provides a connection between the institutional theory and financial intermediation theory. It does not just make sustainable finance appear as a reform of governance but as a controlled redistribution of capital, which bridges the policy intervention with the performance of net-zero transition.

7. Practical Implications

The results confirm the overall importance of regulatory mechanisms in determining sustainable financing results. Climate-related disclosure requirements, regulatory transparency, and green taxonomies play a major role in enhancing governance changes and lending practices at banks. This is in line with the existing studies that underscore the role of supervisory intervention in climate risk regulation and financial stability (Demekas and Grippa, 2022; Brinkman, 2023). These findings also corroborate claims that regulatory changes can produce a combination of compliance-based alignment, as well as structural financial transformation (Ahlström and Monciardini, 2021). The harmonized standards, clear green classification systems, and prudent tools through which the environmental risk is incorporated into the capital adequacy frameworks should therefore be the priorities of policymakers. It is indicated by evidence related to comparative regulatory settings that proactive supervision aligned with climate causes sustainable reallocation of credit faster (Alhejaili, 2024; Larsen, 2022).

Among the banking leaders, the results indicate that the ESG integration should go beyond the compliance of reporting and should be integrated into the very systems of operations. It has been established that sustainability, which is incorporated into risk management and internal controls, improves financial and environmental performance (Landi et al., 2022; Guan et al., 2026). But in line with the criticism of symbolic ESG implementation (Fernández-Muro & Casalegno, 2025), the research paper proves that reforms in governance are not directly associated with the quantifiable transition results. Sustainable impact can only come to fruition when ESG principles are used in credit allocation. This supports the arguments about the executives incorporating ESG metrics in credit appraisal systems, portfolio risk evaluation, and strategic capital deployment decision-making (Saviano et al., 2024; Siddik et al., 2023).

The findings are strategically important, placing green lending as the main channel of transmission between regulation requirements and governance changes to the outcomes of transitions. The observation is consistent with the literature that focuses on the transformative role of banks in funding low-carbon transitions (Campiglio, 2015; Colenbrander et al., 2022). Sustainable finance strategies ought to hence focus on growing climate consistent loan portfolios, funding renewable energy infrastructures and decreasing carbon-intensive exposures at a gradual pace. The framework of portfolio-level net-zero alignment and climate stress testing are devices that are crucial in this transition (Fankhauser et al., 2023; Billio et al., 2024).

The results also confirm that sustainable finance is more of a systemic transmission process and not an independent ESG compliance (Monasterolo et al., 2024; Gabor and Braun, 2025). The integrated strategies adopted by banks should be combining regulation compliance, governance embedding, risk management and capital allocation as part of the single sustainability road map.

7. Limitations and Future Research Directions

There are some limitations of this study that are to be considered. First, cross-sectional research design does not permit the ability to make causal inferences

and to monitor dynamic changes in sustainable finance practices over time. Rather, sustainable banking change is evolutionary in nature, and longitudinal data would give a more insightful picture into how regulatory pressures and ESG integration coupled with green lending practices evolve over various stages of the policy implementation. Second, the paper is limited by the banking industry and geographic setting, which can restrict the universalization of the results to other financial institutions or geo-regulatory settings. The existence of institutional maturity, intensity of climate policy, and financial market development might have different impacts on different countries. These limitations might be overcome by future research by taking longitudinal studies, cross-country comparative research, and multi-industry research to demonstrate the strength of the sustainable finance transmission framework in different institutional contexts.

8. Conclusion

This paper empowers the empirical information that the structured transmission of the regulatory structure, embedding ESG governance, and green lending practices are the driving forces of sustainable transition results in the banking sector. The results indicate that policy frameworks are the main institutional force, which impacts ESG integration greatly and affects the outcomes of green lending and transition directly. Nevertheless, ESG integration, in itself, does not generate the sustainability impact that may be measured unless it is operationalized to distribute credits on a climate basis. Green lending can be viewed as the key transmission channel in which governance reforms can be converted to net-zero and sustainability practices. The research confirms this sequential channel and, therefore, the study presents a consistent transmission model of sustainable finance that explains the interaction between regulatory intervention and internal governance structure to transform capital distribution and speed up low-carbon transition in the banking system.

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