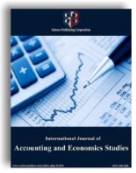
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Research paper



Linking Green Banking and Bank Environmental Performance Through Green Finance: A Study On Indian Commercial Banks

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Abstract

This study examines the impact of green banking and green finance on the environmental performance of banks and whether green finance serves as a mediating factor in this relationship. Primary data were collected through structured questionnaires from employees of selected commercial banks in Haryana. The primary data were collected among bank employees, resulting in a sample of 160 respondents. The Structural Equation Modelling (SEM) approach was used to test, confirming strong validity, reliability, and predictive relevance. The findings indicate that green financing has a significant positive impact on the performance of the environment, as compared to green banking, which contributes positively to green financing and the environmental performance of the banks. Another finding of the study is that green banking is shown to relate to the environmental performance of banks through green financing. This complementary mediation highlights that financing mechanisms are critical for achieving environmental outcomes through banking policies. The result implies that implementing GB initiatives such as loans for eco-friendly projects, online banking, renewable energy investments, and waste management can reduce banks' carbon footprint, improve sustainability, and boost competitiveness. By confirming the mediating role of green finance, the study contributes to both academic literature and practical banking strategies, particularly in emerging economies striving for sustainable development.

Keywords: *Green Banking; Green Finance; Bank Environmental Performance; Structural Equation Modelling; PLS Predict.*

1. Introduction

China deserves credit for setting ambitious environmental targets and making efforts to safeguard the environment. However, the scale of environmental damage has largely outpaced these efforts, rendering many of the goals ineffective or merely symbolic. For instance, despite investing billions of dollars to address water pollution in Taiho Lake, the country's third-largest freshwater lake, significant challenges remain(Liu & Diamond, 2008). However, as the country started to grow, it turned out to be the largest energy group consumer and the largest polluter in the world, being dependent on coal and oil sources and fuel that constituted 70% of all energy consumption (Liu et al., 2018). Such heavy reliance caused rampant releases of carbon dioxide, sulfur dioxide, and solid wastes that posed risks to human lives and delicate ecosystems (Bi et al., 2014; Venners et al., 2003; Wei et al., 2014). When environmental repercussions became quite evident, China started plotting a sustainable path. By 2002, the 16 the National Congress of the Communist Party of China applied the priority in building a well-off society in enhancing the sustainable development capacity. With the idea of sustainable development, policymakers and researchers came together with activities such as cleaner production, recycling of resources, taxes that were imposed on the environment, and the initiation of green finance.

Green finance quickly became a financial innovation with the audacious objective of balancing environmental care with economic advancement. Green finance is the funding of investments that support environmental advantages, according to the International Finance Corporation. With 144 green bonds valued at over 267 billion yuan and 8.23 trillion yuan in green loans distributed, China emerged as one of the major worldwide participants in the green bond market by 2018 (Zhang, B., & Wang, Y., 2019). Even so, China's carbon finance initiatives started in 2011 with pilot carbon trading schemes in Guangdong and Hubei provinces, which quickly grew. By 2017, there were 200 million tonnes of trade, totalling 4.7 billion yuan in value. In the field of carbon finance, China has become a dominant force.

This transformation marked a clear departure from traditional finance, which focused solely on financial returns. Green finance introduced environmental impact as a critical measure of success, with financial decisions now reflecting concerns about resource use and pollution.

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While Wang et al. (2019b) emphasised its emphasis on integrating environmental regulations into all investment and financing decisions, Wang and Zhi (2016) characterised green finance as a novel paradigm that combines economic and environmental aims.
Globally, the banking industry is undergoing a similar shift. Previously, banks were not seen as contributors to environmental issues, but this view has changed as their high energy use and financing of polluting industries were called into question (Shaumya & Anton Arulrajah, 2017). The significance of banks in environmental sustainability was further highlighted by the Paris Agreement and the G20 conferences. As a remedy, green banking (GB) was developed, promoting environmentally friendly financial procedures to lower carbon emissions and advance sustainability (Koiry et al., 2017).
Emerging economies, particularly Bangladesh, felt the urgency of climate action. Bangladesh Bank spearheaded efforts to advance green financing and bring the nation's economy into line with the Sustainable Development Goals (SDGs), making Bangladesh one of the first nations to embrace green banking practices in 2011. These initiatives were crucial in Bangladesh's shift to a green economy (Bangladesh Bank, 2011).
The structure of the paper is organized as follows: Section 2 provides a literature review of studies related to GB, GF, and BEP, along with the theoretical framework of the study, hypothesis formulation, and research gap. Section 3 includes the detailed methodology employed. Section 4 depicts data analysis and results. Section 5 provides discussions conclusion, followed by Section 6, which encompasses theoretical and practical implications. Section 7 includes research limitations and potential future research directions.

2. Review of Literature

2.1. Theoretical review

The theoretical justification of the current study is the resource-based view (Barney, 1991), agency theory (Eisenhardt, 1989), and institutional theory (DiMaggio & Powell, 1983). The institutional theory explains that three Coercive, normative, and mimetic institutional isomorphic constraints require the organisations to comply with the requirements of environmental protection.
Environmental norms are imposed in the industrial and service firms as well as on banks by the governments and municipal bodies, and pressure is being exerted on any organisation to implement environmentally friendly operations through coercive influences (Sarkis et al., 2010; Zhu et al., 2013). According to Lai et al. (2011), normative pressures imply that organisations adhere to social norms that have raised expectations for halting environmental degradation. Mimetic pressures cause businesses to imitate the tactics of their rivals in environmentally friendly banking, packaging, marketing, and production (Christmann & Taylor, 2001). Banks are encouraged to implement green banking practices by these three isomorphic pressures (Harris, 2006). RBV is another theory that forms the basis of this study. It states that companies try to sustain a competitive edge by putting pro-environmental initiatives into effect, which are regarded as strategic competencies. Businesses taking steps to minimise pollution, protect the environment, reduce emissions, and support environmental sustainability may provide you with a competitive edge (Aragon-Correa & Sharma, 2003). Pro-environmental behaviours have been shown to positively correlate with performance and profitability in several previous studies (‘Aracil et al., 2021’; ‘Aslam & Jawaid, 2022’; ‘Watson et al., 2004’).

2.2. Empirical review

2.2.1. Green banking

Green banking enables banks to actively contribute to sustainability through digitalisation, eco-friendly operations, and ethical banking practices (Fenn,2012). Its successful adoption depends on employee awareness and institutional training, while operational challenges encourage a shift toward a socially responsible banking model (Bhat et al.,2021; Mohsin et al.,2021). Empirical studies show that green banking improves environmental performance, reduces carbon emissions, enhances customer trust, and strengthens brand reputation, with public sector banks leading adoption (Bose et al.,2018; Sreesha CH. et al.,2014; Sharma &Choubey, 2022). However, continued financing of environmentally harmful activities highlights the need for stronger regulatory oversight (Hassan et al.,2014) despite strong expectations regarding the future growth of green banking (Srivastava et al., 2014; Zhang et al., 2022). Green banking method favourably and considerably improves bank environmental performance, according to recent research conducted in the Indian banking sector. Research demonstrates that programs like energy-efficiency branch operation, digital and paperless banking, and environmentally conscious lending reduce resource consumption and carbon emissions in banks (Gulzar et al.,2024).
H1: ‘Green banking has a significant impact on a bank's environmental performance’.

2.2.2. Green finance

Green finance literature indicates that incorporating environmental criteria into lending and investment decisions is essential for managing environmental risk and ensuring long-term profitability (Patel &Desai, 2024. Studies reveal that green finance supports renewable energy, clean technology, and sustainable business practices, resulting in reducing carbon emissions and improving environmental outcomes for both banks and borrowing firms (Julia et al.,2019; Hoque et al.,2019). Larger banks are found to disclose green loan information more extensively due to greater regulatory and stakeholder pressure, whereas banks with weaker financial positions or higher non-performing assets exhibit a lower disclosure level (Patel & Desai, 2024). Strategic assessments identify green finance as an opportunity-driven domain with associated risk and threats, requiring structured frameworks for effective implementation (Fakhira et al., 2023). Furthermore, empirical findings confirm that the adoption of green finance and green accounting practices enhances both financial and environmental performance, strengthening banks’ competitiveness and contributing to sustainable economic growth (Hossain et al.,2020; Zhang et al.,2022). However, due to variations in policy execution, managerial commitment, and the lack of a uniform regulatory framework, a recent study has found that the environmental advantages of green finance vary among Indian banks(Yadav et al.,2024). Overall, research indicates that green finance is essential to enhancing environmental performance in the Indian banking industry. Hence
H2: ‘Green finance has a significant impact on a bank's environmental performance.’

2.2.3. Green financing mediates the relationship between green banking and banks’ environmental performance

Green finance, environmental sustainability, and green innovation are closely interconnected, with evidence of long-term relationships on influencing environmental and innovation outcomes across countries (Wang et al.,2022). While banks' direct environmental impact is

limited, their operational practices, particularly paper and energy consumption, pose sustainability challenges, underscoring the importance of integrating corporate social responsibility into banking operations for long – term performance (Nandini Prabhu et al.,2023; Narayanan &Chandrasekaran,2023)

Recent research shows that green banking practices and green financing efforts are important in improving the environmental performance of Indian banks. According to empirical research, green banking strengthens overall environmental performance by encouraging the creation of a green financing structure that supports sustainable investment in addition to directly improving environmental results (Thapliyal et al., 2025). Furthermore, studies on Indian commercial banks indicate that green banking programs support both environmentally sustainable and general sustainable development objectives (Yadav, Singh, Vaishnav, 2024). Environmental product and rising consumer and bank knowledge.

H3: Green financing significantly mediates the relationship between green banking and banks' environmental performance.

2.3. Research gap

Many studies around the world have explored green banking, looking at how it's being adopted, the trends and development, the challenges and opportunities it presents, and its role in promoting environmental sustainability(Rehman & Ullah et al., 2021; Wang et al., 2021; Agrawal et al., 2024; Meng et al., 2024). Most of the research on how green banking, green finance, and environmental performance are connected has been done in countries like Bangladesh, Pakistan, Nepal, and Shri Lanka. In India, although a few studies have looked at this relationship, very little work has been done so far (Kumar et al., 2024; Bansal et al., 2023; Gulzar et al., 2024). Studies already conducted centre on how the adoption of green banking practices affects bank environmental performance and promotes green finance in Uttarakhand state (Thapliyal et al.,2025), not in Haryana. This study examined green banking, green finance, and environmental performance as distinct yet interrelated constructs and applied a two-stage Structural Equation Modelling (SEM) approach to analyze the relationship. This is the major gap in our studies.

Research Questions

1) "To find out the impact of green banking on bank environmental performance".
2) "To find out the impact of green finance on bank environmental performance".
3) "To examine the relationship between GB and banks' environmental performance is significantly mediated by the green financing".

Conceptual Framework

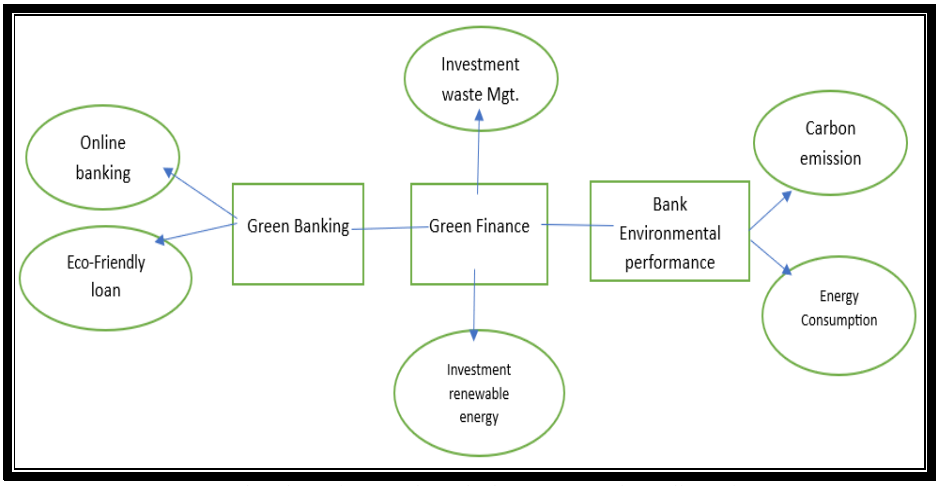


Fig. 1: Flowchart of Research Methods (Source: Authors' Illustration).

3. Research Methodology

The present study focuses on examining the practices of green banking within major financial institutions in India. Specifically, State Bank of India and Punjab National Bank (PNB)have been selected as representatives of the public sector, while HDFC and Axis Bank represent the private networks, and notable engagement in green banking initiatives. Prior research indicates that large, leading banks are more often inclined to adopt and implement effective environmental sustainability practices (Scholten, 2009; Jeucken,2001). Moreover, comparative analysis between public and private sector banks is well–supported in the existing literature on green banking (Bhal, 2012; Ullah et al., 2018). In designing the sample for this study, it is important to note that previous research in green banking has successfully employed a sample size between 150 and 200 participants. This established precedent justified the selection of a sample of 160 for the current investigation, aligning with accepted practices in the field. For instance, Gupta and Singh (2020) validated such a sample size in their study on SEBI's role in promoting sustainable practices and ESG reporting in India. The selection sample size is expected to provide reliable and meaningful insight into the relationship between green banking practices and environmental performance.

The study included 160 bank employees from various branches in Northern India, especially in Haryana. Participants represented a range of positions, from managerial to operational roles, with voluntary participation. Data were collected through a cross-sectional study utilizing the snowball sampling method, as outlined by Choy (2014).

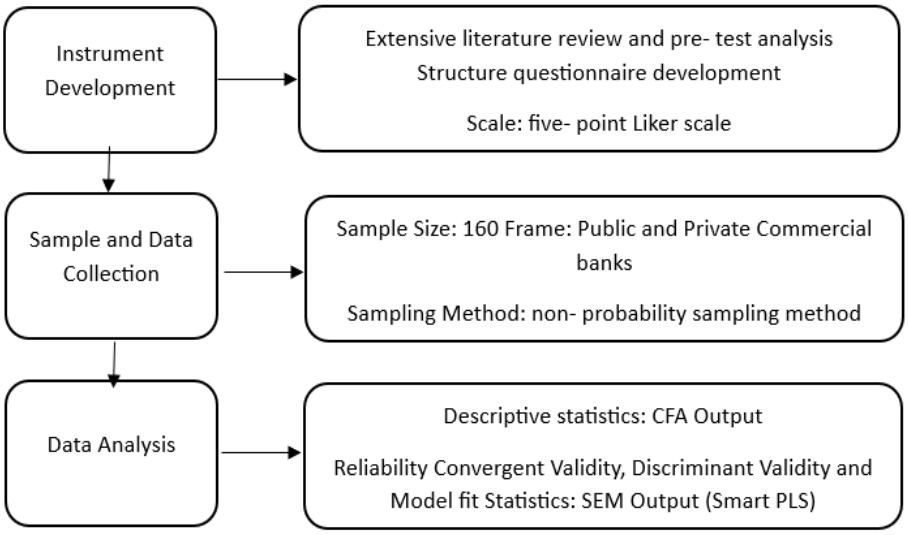


Fig. 2: Flowchart of Research Methods.

Source: Authors' Illustration.

3.1. Instrument development

The research questionnaire was developed by adapting measurement items from earlier green banking (GB) studies. The instrument was divided into four main sections: environmental performance of banks, green banking practices, green financing, and demographic variables. The age, gender, and educational background of the respondents were gathered in the demographic section. Green banking, green finance, and environmental performance measurement items were taken from Zheng et al. (2021), Risal and Joshi (2018), and Miah, Rahman, and Haque (2018). A pilot study was conducted using the 29- items questionnaire with a sample of 35 randomly selected employees from a commercial bank in Haryana. Responses were measured on a five-point Likert scale ranging from "strongly disagree (1) to "strongly agree" (5).

3.2. Sample and data collection

Table 1: Demographic Information of Respondents (n=160)

Variable	Items	Frequency	Percentage
Gender	Male	65	40.6%
	Female	95	59%
Age	18-35	129	80.6%
	36-50	26	16.3%
	51& Above	5	3.1%
Qualification	Intermediate	28	17.5%
	Bachelors	117	73.1%
	Master's Degree	15	9.4%
Name of bank	SBI	49	30.6%
	PNB	85	53.1%
	HDFC	24	15.0%
	AXIS	2	1.3%
Branch	Urban	54	33.8%
	Rural	92	57.5%
	Semi-Urban	14	8.8%

Source: Author's Calculations.

This study focused on banks operating in Haryana, including the State Bank of India, HDFC, Punjab National Bank (PNB), and Axis Bank. The study aimed to identify key GB practices in commercial banks and evaluate their impact on green financing and the environmental performance of bank. Primary data was collected from bank employees using a non-probability sampling approach. A total of 200 structured questionnaires were distributed from June to October 2024, of which 160 valid responses were received, yielding a response rate of 90.96%. The demographic profile (Table 1) reveals a young and educated workforce in the Haryana banking sector. Most respondents (80.6%) were aged between 18 and 35, followed by 16.3% aged 36-50, and only 3.1% aged above 50. This younger cohort likely contributes to great adaptability and openness to green banking initiatives. Additionally, a majority (73.1%) held bachelor's degrees, further indicating a well-educated sample, potentially better equipped to understand and implement green banking practices. Female respondents made up 59% of the sample, while 40.6% were male, reflecting strong gender representations. The majority of the responses came from PNB (53.1%), followed by SBI (30.6%), HDFC Bank (15%), and AXIS Bank (1.3%). Interestingly, over half (57.5%) of the respondents were based in rural branches, showing that green banking efforts are not limited to urban settings but are gaining momentum in rural areas as well.

3.3. Common method bias

Common method bias is particularly likely when data are collected through self-administered questionnaires, especially when all construct is measured using responses from the same participant (Podsakoff et al.,2003). As the present study adopts a cross-sectional design and relies on self-reported data, several procedurals remined were implemented to minimize CMB. In the context of structural equation modelling (SEM), the assessment of inner VIF values is useful for identifying potential common method bias by revealing collinearity among latent constructs. According to widely accepted guidelines, a VIF value below 3.3 suggests that multicollinearity is not problematic and

indicates a low likelihood of CMB affecting the result (Kock, 2015). Conversely, a VIF value exceeding this threshold may signal collinearity issues that could be attributable to common method bias.

Table 2: Assessment of Multicollinearity (VIF)

Green Banking	VIF Value	Green Finance	VIF Value	Bank Environmental Performance	VIF Value
OB1	1.670	IRE1	1.668	CE1	2.824
OB1	1.822	IRE2	2.004	CE2	2.621
OB3	1.879	IRE3	1.883	CE3	2.115
OB4	1.670	IWM1	1.820	CE4	1.841
OB5	1.902	IWM3	2.613	EC1	1.669
OB6	2.176	IWM4	1.518	EC2	2.759
LEP1	2.676	IWM5	1.121	EC3	2.941
LEP2	2.749	IWM6	1.820	EC4	1.622
LEP3	2.939				
LEP4	2.778				
LEP5	2.986				
LEP6	3.267				
LEP7	2.533				

Sources: Author's Calculations.

3.4. Data analysis strategy

The main method of data analysis used in this study was structural equation modelling and confirmatory factor analysis (CFA). Standardized factor loadings, critical ratios, and overall model fit indices were evaluated using CFA in compliance with Gerbing and Anderson's (1988) recommendations. Model specification, data screening, parameter estimates, model fit assessment, and investigation of the relationship between the latent constructs were all part of SEM. The measurement model was validated using CFA, and the structural relationships were tested using SEM, in accordance with the two-stage analytical process suggested by Hair et al. (2019). Cronbach's alpha and Composite reliability were used to measure reliability, and standardized factor loading and Average variance extracted (AVE) were used to measure convergent validity

4. Result and Findings

4.1. Evaluation of the measurement model

Assessing the measurement model's validity and reliability are the main factors to be taken into account, according to Hair et al. (2019, 2022). The analysis's conclusions show that the indicators are valid and that the reflective indicators have both discriminant and convergent validity within the pertinent domains (Table 3). To ascertain construct dependability, the outer loading of each indicator linked to its construct has been evaluated, and it has been ensured that the minimum is 0.708, in accordance with Hair et al.'s (2019) recommendations. Cronbach's alpha and composite reliability (CR) scores are shown in Table 3 and fall between 0.70 and 0.95. All reflective constructs have surpassed the 0.50 threshold value, suggesting satisfactory convergent validity, and the average variance extracted (AVE) approach has validated the model's convergent validity. Except for one indicator, IWM3 0.617, IWM4 0.672, LEP7 0.630 (Table 3), which has been kept since it is higher than 0.60, the indicator loading constructs have been found to surpass the threshold value of 0.708 (Hair et al., 2022). For the variables to be utilised in Smart PLS software, the items of each variable are represented by shortened codes. For example, "investment waste management" is recorded as "IWM," and "online banking" is labelled as "OB." The discriminant validity of the first-order components has been assessed using the Heterotrait-Monotrait (HTMT)ratio (Table 4) (Henseler et al., 2015). Since the ratios for green banking, green finance, and bank environmental performance are higher than the tolerance, the HTMT inference approach has been used.

Table 3: Construct Validity

Construct	Item code	Loading	Cranach's α	rhoA	CR	AVE
Carbon Emission (CE)	CM1	0.825	0.868	0.869	0.910	0.717
	CM2	0.873				
	CM3	0.833				
	CM4	0.856				
Energy Consumption (EC)	EC1	0.766	0.827	0.828	0.878	0.591
	EC2	0.784				
	EC3	0.762				
	EC4	0.799				
	EC5	0.730				
Investment Renewable Energy (IRE)	IRE1	0.846	0.758	0.765	0.862	0.676
	IRE2	0.869				
	IRE3	0.747				
Investment Waste Management (IWE)	IWM1	0.726	0.824	0.835	0.872	0.533
	IWM2	0.808				
	IWM3	0.617				
	IWM4	0.672				
	IWM5	0.768				
	IWM6	0.810				
Loan-Eco-Friendly Product (LEP)	LEP1	0.781	0.865	0.869	0.896	0.554
	LEP2	0.740				
	LEP3	0.782				
	LEP4	0.742				
	LEP5	0.809				
	LEP6	0.713				
	LEP7	0.630				
Online Banking (OB)	OB1	0.788	0.885	0.886	0.913	0.636

	OB2	0.836
	OB3	0.760
	OB4	0.819
	OB5	0.762
	OB6	0.819

Sources: Author's Calculations.
Note: Cronbach's α = Cronbach Alpha, CR= Composite Reliability, AVE= Average Variance Extracted.

Table 4: Discriminant Validity (HTMT)

Construct	CE	EC	IRE	IWE	LEP
EC	0.851				
IRE	0.905	0.934			
IWE	0.814	0.848	0.917		
LEP	0.775	0.837	0.893	0.764	
OB	0.644	0.635	0.749	0.708	0.828

Sources: Author's Calculations.
Note: CE=Carbon Emission, EC= Energy Consumption, IRE= Investment Renewable Energy, IWE= Investment Waste Management, LEP= Loan Eco-Friendly Product, OB=Online Banking.

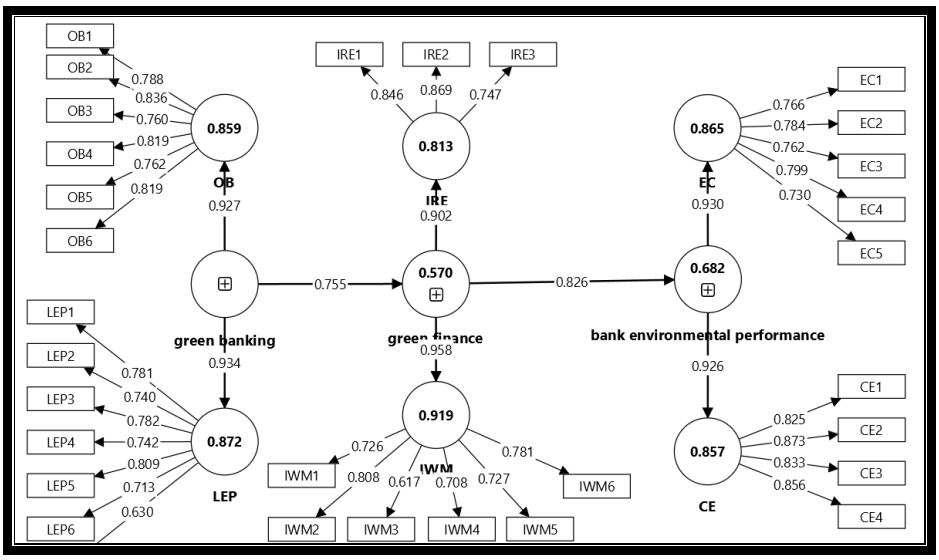


Fig. 2: Measurement Model of First-Order Construct.

4.2. Measurement model assessment of second-order constructs

Two independent variables—online banking and loans for environmentally friendly projects—as well as mediating variables—investment waste management and investment renewable energy project policy—have been evaluated in reflective-reflective mode as second-order constructs. The latent variable score (LVS) of the lower-order constructs of green banking, green finance, and bank environmental performance has been used to gauge the second-order construct evaluations. The values of the higher-order constructions' indicator loadings, convergent validity (AVE), rho A, and CR are displayed in Table 5. All of the study's indicators have dependability ratings over the essential limit of 0.70. The acceptable range of 0.70 to 0.85 is occupied by the Cronbach's alpha and Cronbach's CR values (Hair et al., 2019, 2022). It has been discovered that the constructs' AVE values exceed 0.60, which is higher than the conceptual model's basic requirement of 0.5. In every aspect, the study's findings support the previous research (Hair et al., 2017). The HTMT ratio of correlations has been used to assess discriminant validity. In contrast to the acceptable level of 0.90, the ratio of green banking to bank environmental performance is 0.861, and the ratio of green finance to bank environmental performance is 0.890.

Table 5: Construct Validity on Higher Order

Higher-order construct	Indicators	loading	Cranach's α	Rho A	CR	AVE
Bank environmental performance	CM	0.927	0.839	0.839	0.925	0.861
	EC	0.929				
Green Finance	IRE	0.928	0.851	0.862	0.928	0.865
	IWE	0.937				
Green Banking	LEP	0.942	0.845	0.854	0.931	0.870
	OB	0.918				

Source: Author Calculation.
Note: CE=Carbon Emission, EC= Energy Consumption, IRE= Investment Renewable Energy, IWE= Investment Waste Management, LEP= Loan Eco-Friendly Product, OB=Online Banking, Cronbach's α = Cronbach Alpha, CR= Composite Reliability, AVE= average Variance Extracted.

4.3. Structural model assessment

The next stage is to validate the structural model after the measurement model has been satisfactorily assessed. The structural model assessments were carried out in compliance with Hair et al. (2019, 2022). According to Hair et al. (2017), the endogenous variable's coefficient of determination (R2) has been established. Significant explanatory power can be explained by the R2 values of 0.709 for bank environmental performance and 0.581 for green finance, according to Chin's 1998 analysis. Because of this, it can be concluded that green banking accounts for 70% of the variability in bank environmental performance, whereas green financing accounts for 57% of the

variability. The following stage involves examining the inner value of the Variance Inflation Factor (VIF). The highest VIF, which is below the crucial value of 3.33, is 2.367 (Hair et al., 2019). After that, 5000 subsamples were used to evaluate the hypothesis using the bootstrap technique (Hair et al., 2022). As shown in Table 6, Green banking (GB) had a significant and positive effect on Bank Environmental Performance (BEP) ($\beta = 0.231$, $p = 0.021$), supporting H1. Similarly, Green Banking significantly influenced green finance (GF) ($\beta = 0.760$, $p < 0.001$), supporting H2. Finally, Green finance significantly impacted Bank Environmental Performance ($\beta = 0.652$, $p < 0.001$), confirming H3. The effect size was assessed using Gignac, G. E., & Szodorai, E. T. (2016) standards, and it was determined to be 0.070, indicating a large effect size (Table 6). The structural model assessment evaluations are displayed in Fig. 3. Using the HTMT approach, the discriminant validity was assessed, and the result was be 0.856 green banking and bank environmental performance and green banking and green finance to be 0.891 also. (Hair et al., 2019).

Table 6: Test of Relationship between Variables

Hypothesis	Path relationship	(β)	Cl (0.95)	VIF	F SQUARE	R2	Support
HI	GB, BEP	0.231	(0.041:0.398)	2.367	0.077	0.703	Supported
H2	GB, GF	0.760	0.665:0.830)	1.000	1.367	0.575	Supported
H3	GF, BEP	0.652	(0.503:0.806)	2.367	0.613		Supported

Sources: Author calculations.

Note: GB = Green Banking, GF= Green Finance, BEP = Bank Environmental Performance.

(β)= Path Coefficient, CI = Confidence Interval at 95%, VIF= Variance Inflation Factor, * P = <0.05, ***P= < 0.001.

4.4. Mediating relationship

Table 7 presents the result of the mediation analysis. The indirect effect of green banking on bank environmental performance through green finance was significant ($\beta = 0.508$, $p = 0.000$), confirming that green finance acts as a strong mediator in the relationship. This complementary mediation indicates that both the direct and indirect effects are in the same direction and significant, reinforcing the importance of financing mechanisms in achieving environmental outcomes through banking policies (Srivastava and Madan 2023)

Table 7: Mediating Relationship

HYPOTHESISE	Beta value	Cl 0.95	SE	T statistics vale	P Value
Green banking <Green Finance<-bank environmental performance	0.508	0.382:0.652	0.068	7.490	0.000

Sources: Author calculations.

Hu and Bentler (1999) introduced the 'standardised root mean square residual' (SRMR) metric. 'Hair, Risher, Sarstedt, and Ringle' (2019) state that the optimal SRMR value for model fit is less than 0.08. The estimated model's SRMR value in this investigation was 0.061, falling within the permissible range of 0.08 and suggesting a good model fit.

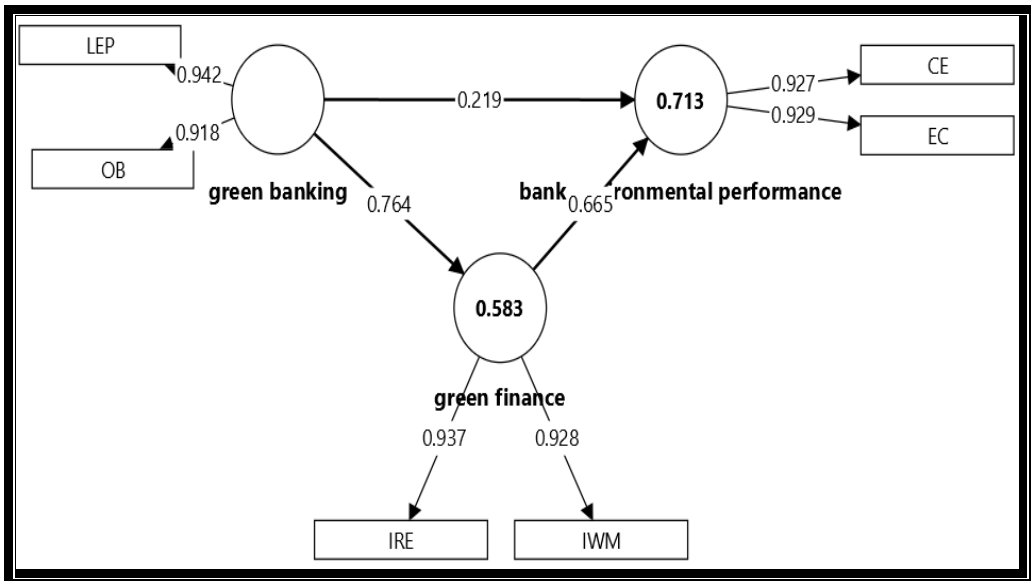


Fig. 3: Measurement Model of Second-Order Construct.

4.5. Predictive relevance evaluation (q2 predict)

A predictive relevance was evaluated using the Q^2 Predict approach ('Danks & Ray, 2018; Shmueli et al., 2019') with the result shown in Table 7. The Q^2 values for all constructs were above zero, confirming that the model has moderate to high predictive relevance. For example, green finance showed high predictive relevance for Investment in Renewable Energy ($Q^2 = 0.507$) and Investment in Waste Management ($Q^2 = 0.459$), while Bank Environmental Performance showed moderate relevance, particularly for Carbon Emission ($Q^2 = 0.416$). To evaluate the endogenous construct of bank environmental performance, Q2 predict was used to compute the prediction error and root mean squared error (RMSE). An examination of the RMSE values between PLS (theorised) and Linear Regression (untheorized) was carried out since the prediction errors were symmetrically distributed (Shmueli et al., 2019). The RMSE value for the PLS model was generally lower than that for the linear regression model (LM), particularly in CE, IRE, and IWM, reinforcing the superior predictive ability of the proposed model (Hair et al., 2019).

Table 8: Predictive Relevance Evaluation (Q^2 Predict)

Construct	Indicators	PLS (partial least squares) RMSE	Q^2predict	LM (Linear regression model) RMSE	PLS-LM RMSE	Predictive relevance
Bank environmental performance	CE	0.769	0.416	0.773	-0.004	Moderate predictive relevance
	EC	0.755	0.438	0.735	0.02	
Green Finance	IRE	0.706	0.507	0.718	-0.012	High predictive relevance
	IWM	0.741	0.459	0.750	-0.009	

Source: Author Calculations.
Note: LM=Linear Model Benchmarks; PLS= Partial Least Squares; RMSE= Root Mean Square Error.

5. Discussion and Conclusion

This study explores the impact of green banking (GB) practices on the environmental performance of banks and the mediating role of green finance. Utilizing standardized questionnaires and Structural Equation Modelling (SEM) to analyze data from bank employees in Haryana, the findings revealed a significant positive correlation between GB practices and banks' environmental performance, confirming Hypothesis 1. These results corroborate previous research (Rishal et al.,2018; Shaumya &Arulrajan, 2017), demonstrating that GB enhances the environmental performance of commercial banks. Additionally, the study supported Hypothesis 2, indicating that GB practices significantly promote green finance in Indian commercial banks, which aligns with the finding of Rehman et al. (2021). Furthermore, Hypothesis 3 was confirmed, showing a strong positive relationship between green finance and bank environmental performance, despite a contrasting result from Rishal and Joshi (2018).
The research underscores the importance of green finance in mediating the relationship between GB practices and environmental performance, contributing new insight to the literature. Additionally, it highlights the benefits of adopting GB practices, including a reduced carbon footprint improve customer satisfaction, lower operational costs, enhanced competitiveness, and the facilitation of online banking services.

6. Managerial Implications of The Study

6.1. Theoretical implications

This study makes several important contributions to research on green banking. First, it confirms the connection between green banking, green finance, and bank environmental performance specially in Haryana, India, a region where, to the best of the author's knowledge, no such research has been done before. Second, it expands the use of two key theories, Agency theory and Institutional theory, within the banking sector. Agency theory talks about how employees (agents) can sometimes act in their own interest instead of doing what's best for the organization or its stakeholders (principals). But this can be fixed if clear rules, responsibilities, and incentives are in place. In our study found that when banks take green banking seriously and offer digital services like online banking, it encourages employees to act responsibly and work toward environmental goals. So, this supports the idea that good internal systems and motivation can push banks to do better for the environment.
Institutional theory says that organizations often follow outside pressures like government rules, industry norms, or public expectations to look legitimate. In our result banks are indeed adopting green practices because of such external pressures, especially in green finance. But we also found that just following the rules is not always enough; some banks show weaker results in areas like waste management, which means they may be doing it more show than for real impact. This partially supports the theory but also shows that just having policies is not enough; real commitment is needed for better results. In some cases, like low scores for certain waste management indicators, our findings suggest that banks may be adopting green policies only on paper, just to meet formal requirements, not because they are deeply committed.

6.2. Practical implications

The study's conclusions can be applied by Indian researchers, scholars, managers, bankers, government officials, financial organisations, and investors. First, GB's efforts have a favourable impact on banks' environmental performance, according to the empirical evidence. So, bank managers should treat this effort as a long-term strategies not just tick boxes for regulators. RBI should establish a certification for green loans, ensuring funding is granted only to projects that meet strict environmental standards (RBI, 2021). Additionally, introducing incentives for green bonds could motivate banks to invest in sustainable projects (RBI, 2020). SEBI can promote sustainability by mandating a comprehensive Environmental, Social, and Governance (ESG) reporting standard, allowing investors to assess the contributions of their investments toward sustainability objectives (SEBI, 2019). Furthermore, SEBI should provide specific guidelines for green finance that include compliance with the ESG standard (SEBI2021). In relation to the SDGs, especially SDG 7, financial institutions should develop innovative products that support clean energy initiatives (UN,2020). By adopting these guidelines, banks and financial institutions in India can significantly advance their commitment to sustainability
Green finance, like funding renewable energy or eco projects, plays a key role in improving environmental outcomes. Banks should create and promote more financial products to support sustainable development. Don't just implement green policies to look good. Banks need to fully integrate them into their daily operations and train staff properly. Otherwise, the result will remain weak or symbolic. Our study used advanced statistical tools to test the impact of green practices. Banks should also use data to track what's working and what's not, so they can improve their strategies. Online banking showed strong results in our study. It reduces energy use, cuts down paper, and supports green goals. The manager should encourage customers to shift to digital platforms.
This study shows that green banking and green finance really do help banks become more environmentally responsible, especially when supported by internal controls and digital tools. While outside pressures (like policies and regulations) push banks to act, real results come from within through strong leadership, staff motivation, and sincere efforts.

7. Limitations of The Study and Prospects

The present study makes notable contributions; several issues warrant consideration for future research. Firstly, the generalizability of the finding is limited due to the focus on a specific subset of commercial bank employees. Broader relevance may be achieved by including various stakeholders, such as non-bank financial institutions (NIBFs, foreign-owned commercial banks (FCBs, and consumers of state-owned commercial banks (SOCBs). Secondly, the assessment of green banking (GB) activities' impact on environmental performance was conducted using a single independent variable (GB), indicating that the relationship is significantly mediated by green finance. Therefore, banks need to allocate more resources to environmentally sustainable initiatives, including waste management, green industry development, renewable energy, and energy efficiency projects. To contribute to sustainable economic development and the achievement of the Sustainable Development Goal (SDG). So, it is recommended that commercial banks closely monitor their financing activities. The absence of a longitudinal analysis restricts the ability to track changes in green banking practices' effect on environmental performance. Additionally, the geographical focus on bank employees in Haryana limits the generalizability of finding to other regions, where banking practices may differ. The lack of cross-country analysis also hinders meaningful comparisons across different nations, which could enrich the understanding of how varying regulations and cultural attitudes influence green banking adoption. Furthermore, while the sample size of 160 aligns with established research standards. The reliance on snowball sampling may introduce bias, resulting in a potentially non- representative sample. Overall, these limitations indicate the need for further investigation.

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