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Green Credit and Lending: Driving Environmental Responsibility in the Banking Sector

Ms. Rachana Pulgam
Research Scholar,
Sinhgad Institute of Management, Pune
Email ID: rpulgam77@gmail.com

Prof. Dr. Sanket L. Charkha
Research Guide and Assistant Professor,
Sinhgad Institutes, SKNCOE-MBA Dept, Pune
Email ID: sanketcharkha.skncoe@sinhgad.edu

Abstract
Green banking has emerged as a key financial strategy for fostering environmental sustainability by integrating eco-friendly practices into banking operations. This study examines the role of green credit, sustainable financing, and ESG compliance in promoting environmental responsibility within the banking sector. It explores the opportunities and challenges faced by banks in adopting green lending policies and assesses consumer perceptions regarding green credit products. Using a combination of factor analysis and hypothesis testing, the study evaluates the relationship between green finance adoption, ESG performance, and bank reputation. The findings highlight the significance of regulatory incentives, consumer awareness, and financial inclusion in enhancing green banking practices. The study provides strategic recommendations for financial institutions and policymakers to accelerate the transition toward sustainable banking through policy improvements, financial incentives, and increased customer engagement.

Keywords:- Green Banking, Sustainable Finance, Green Credit, ESG Compliance, Environmental Responsibility, Financial Inclusion, Banking Regulation, Carbon Footprint Reduction, Consumer Adoption, Green Lending Policies.

Introduction

Alexander (2014) agrees that the banking sector plays a crucial role in promoting sustainable development by acting as an intermediary and facilitating the mobilization of financial resources towards these ends. Sustainable development goals (SDG) financing is ensured, for instance, by the allocation of resources to environmentally friendly initiatives and the administration and disbursement of money from sustainable responsible investment (SRI). Forcadell et al. (2020a) define sustainable banking as the provision of "financial products and services, which are developed to meet the needs of people and safeguard the environment while generating profit." Some outside forces have had a significant impact on the foundations of the banking industry's business model. These include the COVID-19 pandemic, the Fourth Industrial Revolution, and the 2008 financial crisis (Mattila et al., 2010). As a result of these challenges, banks are undergoing a digital and sustainable transformation at a faster rate.

Zhang et al.(2022) define green credit policies as a series of credit policies issued by financial institutions to promote energy conservation and emission reduction. The draft Green Credit Program (GCP) implementation rules for 2023, notified by the Ministry of Environment, Forest and Climate Change of India, defines green credit as a singular unit of an incentive provided

for a specified activity, delivering a positive impact on the environment. This study aims to explore the concept of green credit and lending and how these financial instruments environmental responsibility in the banking sector.

Role of the banking sector in sustainable development

The banking sector plays a pivotal role in promoting sustainable development by directing financial resources towards environmentally responsible projects and encouraging businesses to adopt sustainable practices. By offering green finance products such as green securities, investments and infrastructural bonds, banks support initiatives in renewable energy and energy efficient infrastructure, thereby fostering a low carbon economy (Akomea-Frimpong et al., 2021). Integrating ESG factors into credit assessments enables banks to manage risks associated with environmental degradation and climate change by aligning their operations to sustainability objectives. Furthermore, banks facilitate green innovation by providing financial backing to businesses such as clean tech start-ups and eco-friendly business models. Through CSR initiatives, banks invest in community based environmental projects and sustainability education (Garcia et al., 2021).

Significance of sustainable banking

In the current international system for funding sustainable development, the banking sector is an essential cog in the wheel, serving as an institutional conduit for the transfer and accumulation of global financial capital, the efficient conversion of total savings into total investments, and the deep integration of national financial systems from around the world into the global financial environment. Green banking and methods for its diversification in global settings are the foundation upon which state and regional governments build and execute the strategic goals of green economic growth. According to Bahl (2012), all of this is crucial because it helps national economies adapt to climate change, makes them more financially stable, and reduces the effect of climate risks on overall economic development. The scientific and practical job of determining the role of green lending in the global banking sector is determined by these issues.

Banks, which have a significant impact on national and international economies, are some of the numerous international businesses that have adopted sustainability as a primary value. Banks have long funded various industries without adequately factoring in the effects on the environment. Consequently, they have unintentionally supported activities that interfere with nature's balance. Increased pressure on banks to adopt sustainable practices in light of increasing climate change concerns, global standards like the Paris Agreement, and the Sustainable Development Goals (SDGs).

Significance of the study

This essay delves into how banks can lead the transition to a sustainable economy through green financing, ethical investment strategies, and environmentally responsible operating practices. Green finance, among other things such as renewable energy funding, carbon-neutral banking, and green bonds, is a fundamental component of this transition, which works towards advancing ecological sustainability. This paper explores why there is sustainable banking, the strategies employed by banks, and the challenges that face them. Through the examination of both primary and secondary sources of data, it illustrates how banks can become leaders in sustainable development by satisfying both financial and environmental goals.

Research Questions & Objectives

1. To determine the contribution of green credit and lending in advancing environmental sustainability in the banking industry.
2. To assess the effect of green financing on ESG performance and corporate reputation.
3. To examine the opportunities and challenges involved in applying green lending policies in banks.
4. To assess customer perception and intention to use green credit products.
5. To determine regulatory and market-driven considerations driving green credit usage in banking.

Research Hypotheses

1. H1: Green credit and lending have no substantial effect on environmental responsibility in the banking industry.
2. H2: Green credit and lending positively contribute to environmental responsibility in the banking industry.
3. H3: Active participants in green lending programs have enhanced ESG performance and reputation.
4. H4: Banks' willingness to extend green credit is affected by government incentives.
5. H5: Awareness and demand from the customer influence green lending implementation significantly.

2. Literature Review

2.1. Evolution of Sustainable Banking

Growth of eco-banking and green banks

The financial institutions can contribute their share towards decelerating environmental degradation and earning long-term financial and PR benefits by tailoring their practices according to ESG standards. Blockchain and artificial intelligence are two of the advanced digital solutions that are generating new chances for growth in the green finance sector by promoting efficiency and clarity.

Green innovation can conserve energy and reduce pollution. The notion is established by Yang et al. (2012). In order to achieve the conservation of the environment, the GCP is banking on the banking sector, hence it is mandating banks to incorporate environmental conservation and pollution prevention in their lending policies. There are current policy-level barriers that the GCP has to navigate despite its potential

As a result of the increased interest rates and shorter tenors provided to firms in the polluting sectors, these banks tend to rely on these firms for short-term profits. That money gains are usually given priority over environmental goals makes this financial reliance a principal stumbling block towards fully implementing the Green Credit Programme (GCP). In addition, the legislation is weakened by discrepancies between actual impact and firm-reported environmental performance. Banks' relaxed verification processes and the inflation of environmental credentials by most companies to access loans render the GCP less efficient in reducing pollution. Due to these challenges, this study examines the role of CCBs in contributing to pollution and the application of the GCP, with a focus on the challenges local banks face when attempting to balance economic growth and environmental conservation.

Review of past studies on sustainable banking themes

Based on recent research (Mirza et al. 2023), the term "green credit" has become a high-priority issue for the banking industry globally with regard to development sustainability and environmental issues. It is costly to train human resources at the operating and administration levels, yet it must be done for the green credit program (Jamil et al. 2023). The cost has to be borne by banks since the green credit system is a new effort and developing countries have not kept pace with this system of operation. Also, this spending has to happen because there has to be proper development of technical infrastructure. In the same way lending institutions need to be cautious, so should be the supply of green loans. To ensure that the green credit that banks are providing doesn't actually increase credit risk and erode profits, one needs to examine the impact of green credit on the profitability of funds and the impact of green credit on credit risk. Another upcoming issue in Indonesia's banking industry is green credit, which hasn't yet been taken in by all the banks or even reported on by them. Green banking is something which Indonesia has been trying to implement for some time now in order to improve their financial process.

Green Credit

According to Trkanjec, M. (2024), "green credit" refers to the practice of lending money to businesses and individuals whose missions include protecting the environment. The report's sustainable business loans aren't the only ones that some banks have green credentials that go beyond what's required.

The green credit scheme is anticipated to also provide advantages to banks, since they are profit-oriented enterprises. The effects of green credit on banks' bottom lines have been the subject of several empirical investigations, with conflicting conclusions drawn. Research by Jamil et al. (2023), suggests that green credit might have a negative impact on bank earnings. Nonetheless, green credit boosts bank profitability, according to many research. Since green credit is a novel product that banks might employ to bolster the government's green economy initiative, it is evident from several studies that it negatively impacts credit risk. Green credit, on the other hand, raises the likelihood of bank default, according to other empirical research (Zhou et al. 2021).

Credit risk, liquidity risk, operational risks, capital, and green credit are among the factors that impact the profitability and resilience of banks. A number of research have shown that credit risk affects profitability either positively or negatively; however, came to the opposite conclusion (Golubeva et al. 2019).

To start with, it clarifies the function of local investing in regional pollution prevention programs, providing complex shed light on the effects of federal environmental laws. The banking industry has been the subject of many studies that have emphasised its role while dealing with ecological issues; in the study, not a single one of them delves further that local banks have under the framework of GCP. The research details the involvement of local banks in the GCP rollout and offers supporting evidence in order to reduce noise pollution in the area. What we found can be used in to other emerging nations with their own locally based banks help shape the future of the area.

A loan instrument offered by banks to partially or fully finance or refinance current or new environmental projects at or below market interest rates is known as green bank lending (Manolas et al., 2017). The majority of green investment projects that are planned for the long term will be funded by bank loans, according to scholars. But banks don't care whether borrowers pay back their loans in the long run. Loans made by banks in line with established corporate lending policies are known as "green loans." These loans have several benefits, including helping banks optimise their loan portfolios, reducing the level of credit, economic, and legal risks, enhancing their brand reputation, and developing competitive advantages.

More than a hundred US banks provide environmentally friendly loans, and both the quantity and importance of these loans are growing each year among the country's largest financial institutions (Rai et al., 2019). In emerging markets, green loans are offered by about half of the banks. green investment funds, green insurance, and green advice services are the most prevalent types of green financial products. The majority of these banks are focused on improving banking customer service, even if over 50% of them do not provide green financial services.

Furthermore, between 2015 and 2021, 46–65% of all green loan financing came from the European Union, demonstrating the region's undeniable preeminence. The Asia-Pacific area comes in at 17-27%, the American region at 11-24%, and the African region at a very modest percentage (Zhang et al., 2011). In developed nations, green banking refers to policies that promote transparency as businesses and investors shift their focus to green growth. It also includes policies that give banks that lend to the energy and environmental sectors preferential treatment (Bukhari et al., 2022) and that adhere to ESG principles when buying assets and accepting collateral. These actions initiate processes in developing nations to refinance green projects, establish a minimum amount for the proportion of green financing in bank portfolios, and build corporate banking systems to handle social and environmental risks. Green financing is when banks put money into low-carbon initiatives, such building solar power plants and wind farms, or making homes and businesses more energy efficient (Leonard et al., 2014). In addition to lowering carbon

dioxide emissions, green loans may help with community development, energy cost optimisation, new job creation, green city construction, green technology market growth, etc.

With all these aside, this research will attempt to identify the existing problems and objectives of financial institutions on the growth of green financing. The attempts to rebuild nature while improving risk management form what they term as "green banking" or "sustainable banking," a banking term that seeks to render the banking industry more socially responsible and environmentally friendly. Green banking, as defined by the UN Environment Program (UNEP), is a type of financial practice that can contribute to enhancing social equity and human well-being, reducing environmental risks, and promoting ecological alliances.

As defined by Akhter et al. (2021), "green banking" is a financial institution's attempt to invest mostly in environmentally aware firms and projects to reduce their harmful impacts on the environment. Banks cannot thrive without a good ecosystem, hence "green banking" can help minimize market competition as well as conserve the environment.

Green banking encompasses a wide range of practices, including but not limited to: electronic banking, mobile banking, internet banking, green checking accounts, green credit or financing, electronic banking outlets, and energy conservation initiatives that support environmental sustainability programs (Rahman et al. 2023). By launching green banking, the bank is introducing its current and future clients to the idea of paperless financial services that are based on information technology. Another initiative aiming to elevate banks to the position of responsible corporate actors in attaining sustainable development is known as "green banking".

One kind of green banking is green credit, which refers to loans extended to green enterprises or initiatives. Financial institutions provide "green credit" to businesses that demonstrate a commitment to preserving the environment, conserving energy, and lowering pollution levels. Furthermore, green credit is a method by which financial institutions take ESG factors into account when making investment decisions; this, in turn, increases funding for environmentally and socially responsible economic projects over time (Yasmin and Akhter 2021).

In order to improve the development of green credit, some changes are still required for banks in its implementation. More funding is required than for traditional credit in order to back green credit distribution (Zhang 2021). Since green credit is still in its infancy, much work is required to refine it. According to Chen et al. (2022b), the expenses associated with product development, marketing, technology, and maintenance will be higher when using green credits. Due to the massive nature of the green credit funding need, its implementation will be more challenging for smaller and medium-sized banks than for larger ones. Since green credit is a brand-new and, therefore, pricey product, it is essential to have the owner's backing. Green credit and other innovative product developments are often met with owner reluctance due to the significant risk associated with them (Wilkinson et al. 2017).

Working theory

Sustainability in Financing, Financial Security, and Earnings

Green credit, in which banks lend money to initiatives or companies that work to improve the environment. The demand for green finance is on the rise, driven by entrepreneurs who understand the significance of sustainability. Companies with little long-term risk are likewise incentivised by the government (Andaiyani et al., 2023). So, it stands to reason that banks' bottom lines will see an uptick with the expansion of green lending. Green credit boosts bank profitability, two studies that looked at the topic in China and Indonesia, respectively. Bank stability is critical since one of the bank's objectives is to run efficiently and without interruption (Ferhi 2018). It is believed that green credit would enhance bank stability and will have the backing of

investors, the public, and the government. The quantity of credit has an effect on the security of the bank, according to Setiawan et al. (2021).

Length, Security, and Profitability of Banks

The size of a bank can be estimated by looking at its total assets, which reflect the scope of the businesses controlled by the bank. People are more likely to trust bigger banks, which means they are better able to spread loans and mobilise client finances. A bank's capacity to diversify its asset portfolio, which in turn boosts profitability and stability, is directly proportional to the size of its asset base. Consistent with this finding is research that shows a favourable relationship between bank size and profitability.

Capital, Financial Stability, and Financial Performance

Capital is crucial because it serves as a safety net for banks in the event that they incur losses.

Capital from banks may be utilised as a loan, and more public trusts are established as a result of the enormous capital. Customers will have greater faith in the bank and its capacity to leverage that confidence into increased earnings and stability if the capital is substantial. Results from actual research showing that bank capital increases profitability are consistent with this conclusion. On the other hand, Krisvian and Rokhim (2020) found that capital increases the stability of banks.

Potential Dangers in Operations, Financial Security, and Earnings

For banks to make money, they have to pay for things like operations. A higher operational cost indicates less efficiency on the part of the bank and a larger risk to its operations. The bank's stability and profit rate will suffer as a result of significant operational risk. Found that operational risk had a negative effect on profitability. My and Quoc (2022), Tran et al. (2022), all found that operational risk had a negative correlation with bank stability.

Concerns about Bank Stability and Liquidity as Well as Profitability

Customers' capacity to make withdrawals and fulfil credit obligations is a measure of a bank's liquidity. The loan-to-deposit ratio (LDR) is a statistic that banks use to gauge their liquidity. If a bank has a high LDR, it means they lend more money. Interest revenue is projected to be high for banks that lend more money. Credit risk increases profitability, according to many empirical research. Additionally, research by Tran et al. (2022) suggests that credit risk influences the stability of banks.

Creditworthiness, Financial Security, and Earnings Potential

Interest collected on loans extended is the backbone of every bank's revenue model. But if credit quality is poor, banks face significant credit risk, which may lead to increased credit risk. The write-off of this credit risk will lower profitability. Profitability is inversely related to credit risk. In addition, Chai et al. (2022) found that credit risk might decrease bank stability.

More recent research has shown the interconnected nature of financial systems, the intricacy of the economy, and the effects on the environment examples are Balsalobre-Lorente, Parents of dos Santos. Yousaf et al. (2023), for example, investigate the ever-changing connection between established financial institutions and decentralised ones monetary and banking industries, demonstrating the interplay between Complexities may amplify environmental hazards on a systemic level. In addition, other studies have shown that regional elements that influence the correlation between for both humans and the environment.

As per Bouma et al. (2001), who explored the broader influence of sustainability in the banking sector, there must be a general transformation toward more ethical and ecologically oriented banking practices. The results of their examination point toward integrating environmental considerations into fiscal decision-making. The authors stated that banking sustainability is not only

about being compliant, but also an opportunity to foster innovation and generate profit in the long term. They stressed stakeholders' participation in achieving sustainability goals and called for more collaboration among financial institutions, government, and non-profits.

In 2006, Scholtens examined the knock-on effects of bank lending policies on the environment, drawing attention to the critical role of banks in influencing business practices and encouraging long-term sustainability. He brought attention to the fact that banks' lending methods have a knock-on effect on industries and environmental policies, allowing for often-unsustainable pursuits. He emphasised that banks may promote CSR by tying loan terms to sustainable practices, thereby bringing their corporate aims into line with larger social ones.

Ethical banking practices may help promote environmental sustainability, according to Coulson's (2009) analysis. In order to combat global warming and resource depletion, his research highlighted the need of integrating ethical concepts into banking operations. Enhanced client loyalty and decreased reputational harm were among the competitive benefits of ethical banking that were brought to light by the study.

risks. Financial institutions, according to Coulson, have a moral obligation and a strategic opportunity to practise ethical banking.

Based on Jeucken (2010), who mapped out the evolution of "green banking," banks are increasingly becoming more environmentally friendly over the years. Green banking systems, which prioritize environmental sustainability, have taken the place of more traditional banking models, as his research has illustrated. The need for financial institutions to adapt to new global challenges is increasingly becoming evident, he stated, and this reform manifests that.

The importance of connecting banking business with sustainability was noted whose research was centered on integrating ESG considerations into credit risk analysis. Integrating the ESG indicators, he explained, enables banks to manage risks more effectively while contributing to the environment and society. The long-term impacts on the environment and society are considered when making loan decisions through this approach.

The importance of sustainability reporting towards building trust with stakeholders was emphasized by Bui and de Villiers (2017), who examined the role of the reports in the banking sector. Their study confirmed that financial institutions are more reliable and responsible when they are transparent regarding their sustainability activities. One of the challenges the researchers encountered with sustainability reporting was inconsistency in measurement and criteria. They called on regulators, banks, and standard-setting bodies to collaborate more intensely to deliver sustainability reports that are high-quality and comparable.

The financial risks of global warming and how they impact the banking sector were examined by Caldecott et al. (2018). Physical risks, such as extreme weather, and transitional risks, such as policy changes, both affect financial stability, according to their study revealed. Financial institutions, they noted, must adapt by integrating climate risk analysis into decision-making.

Sullivan et al., in their 2018 paper, provided evidence that green banking practices enhance client trust and loyalty. They established that customers are more inclined to bank with institutions that emphasize social and environmental responsibility.

Marketing and communication also had a significant role in the promotion of green banking products through the study. Banks can strengthen customer relationships and attract environmentally friendly customers by showcasing their sustainability efforts in an attractive manner.

Improved access to international markets and greater stakeholder trust were two of the benefits they mentioned as a consequence of banks' behavior being aligned with regulatory standards.

Green bonds are a key tool for promoting sustainability in banking. In particular, they highlighted the reality that green bonds enable banks to make a direct impact towards environmental conservation through provision of funds for renewable energy

projects and green infrastructure. The rising phenomenon of carbon-neutral banking among global banks was also part of their research. Issues such as costly implementation and lack of standardised frameworks of green bonds were noted by the researchers.

As a comprehensive guide to integrating sustainability into bank operations, the Principles for Responsible Banking were emphasized in the UNEP FI report (2020). In the principles, a road map to align banking practices with the SDGs and the Paris Agreement is charted. Improved risk management and greater stakeholder trust were two of the benefits enumerated in the study as justification for utilizing these principles. Financial institutions may establish themselves as pioneers in environmentally responsible lending by adhering to these standards.

Choudhury analyzed the potential of digital technology in fostering green banking in his research with peers. They focused on how technologies such as blockchain and AI could enhance the efficacy and transparency of green financing. Cyber threats and costly implementation were some of the challenges identified in the research as barriers to incorporating digital solutions into traditional banking systems. Despite such challenges, the researchers held the position that technology development presents possibilities for development and innovation and, therefore, serves as vital enablers of sustainable banking.

Public sector bank contributions to sustainable finance in less developed countries were explored by Bhattacharya and Das (2022). Their study demonstrated that public banks can lead sustainability initiatives by adopting green operating practices and financing renewable energy ventures. (Waghmare et al., 2022) through the growing necessity for trade and industry growth across the world, around is demand for Financial Bodies to take dominant role in the efforts to eradicate poverty, attain reasonable and responsible coordination of authority and safeguard environmental security.

Scope of the Research

The role of green finance and environmentally sustainable business practices in the banking sector in promoting sustainability is the focus of this study. Looking at customer awareness and uptake of green bank products, this report discusses sustainable strategies employed by banks globally and in specific markets. It also explores the opportunities for the adoption of new techniques and the hurdles that the banks have to cross in converting to sustainable operations. Finally, the study looks at the problem from both the consumer and organisational perspectives, presenting practical recommendations on how to encourage sustainable banking practices across the globe.

Material and Methods

Research Design

The quantitative research method is utilized in this research to assess the contribution of green credit and lending programs in promoting the environment responsibility of the banking industry. The research paradigm considers major components such as Carbon Footprint Reduction (CFR), Sustainable Project Financing (SPF), ESG Compliance (ESG), and Customer Adoption (CA).

Data Collection

Primary data were gathered through a structured questionnaire in the form of a survey based on banking practitioners, policymakers, and customers associated with green bank practices. Questionnaire design made use of the Likert scale to assess perceived effectiveness of green lending, adherence to ESG, and consumer willingness to buy green credit. Secondary data included academic journals, industry reports, and regulatory manuals on sustainable finance.

Sampling Method

A purposive sampling method was used in order to obtain the response from the members having relevant experience regarding banking sustainability. The sample consisted of commercial bank professionals, financial analysts, and green credit scheme familiar customers.

Data Analysis

The gathered data was tested through factor analysis and correlation analysis to identify correlations between the adoption of green credit and its effect on environmental responsibility. Statistical software like SPSS was used to calculate the value of correlation between the dependent and independent variables.

Research Instrument

Awareness and Adoption of Green Credit	AAG1	I am aware of green credit and lending initiatives offered by banks.
	AAG2	My bank actively promotes sustainable financing for eco-friendly projects.
	AAG3	Green lending options are easily accessible to businesses and individuals.
Impact on Environmental Responsibility	IER1	Green credit and lending policies help reduce the carbon footprint of financed projects.
	IER2	Banks that engage in green financing contribute significantly to climate change mitigation.
	IER3	The availability of green loans encourages businesses to adopt sustainable practices.
ESG Compliance and Bank Reputation	ECR1	Banks offering green credit have a better ESG performance compared to traditional banks.
	ECR2	Sustainable financing enhances a bank's brand image and customer trust.
	ECR3	Investors and stakeholders prefer banks with strong green lending policies.
Challenges and Opportunities in Green Lending	ChOGL1	Government incentives play a crucial role in promoting green credit adoption.
	ChOGL2	A lack of customer awareness is a significant barrier to green lending expansion.
	ChOGL3	The regulatory framework for green credit needs more standardization and transparency.
Customer Willingness to Use Green Credit	CWGC1	I would choose a green loan over a traditional loan if given the option.
	CWGC2	Green lending should be encouraged even if interest rates are slightly higher.
	CWGC3	I believe banks should prioritize eco-friendly projects when issuing credit.

Environmental Responsibility in the Banking Sector		
Variable	Statement	Abbreviation
Carbon Footprint Reduction (CFR)	Our organization has implemented strategies to reduce carbon emissions in its operations.	CFR1
	The company actively tracks and reports its carbon footprint annually.	CFR2
	Renewable energy sources are integrated into our business processes.	CFR3
	Investments in energy-efficient technologies have significantly lowered carbon emissions.	CFR4
	Carbon footprint reduction is a key factor in our sustainability policies.	CFR5
Sustainable Project Financing (SPF)	The organization prioritizes financing projects with positive environmental and social impacts.	SPF1
	Investment decisions consider sustainability criteria before approval.	SPF2
	The company offers financial inacentives for green and sustainable projects.	SPF3
	There is a dedicated framework for assessing the environmental risks of financed projects.	SPF4
	Sustainable financing is a strategic goal of the company.	SPF5
ESG Compliance (ESG)	The company adheres to environmental regulations and sustainability reporting standards.	ESG1
	Social responsibility policies, such as fair labor practices, are strictly followed.	ESG2
	Corporate governance policies ensure ethical decision-making and transparency.	ESG3
	The organization regularly publishes ESG performance reports.	ESG4
	ESG compliance is integrated into investment and business strategies.	ESG5
Customer Adoption (CA)	Customers prefer our products/services due to their sustainability initiatives.	CA1
	The company actively educates customers on sustainable practices.	CA2
	Sustainable product/service offerings have increased customer retention.	CA3
	Customers are willing to pay a premium for environmentally friendly products/services.	CA4
	The company engages with customers to promote sustainability awareness.	CA5

In order to gather data for the current study, a standardized questionnaire was prepared as the main research tool. A structured questionnaire was prepared to gauge different aspects of green credit and lending programs within the banking industry and their effect on environmental accountability.

This research utilizes two systematic questionnaires to determine the effect of Green Credit and Lending Initiatives towards Environmental Responsibility in Banking. The questionnaires are meant for banking professionals and customers, with an emphasis on separate but related variables.

1. Variables of Banking Professionals' Questionnaire

This questionnaire aims to measure the way financial institutions execute and view green credit initiatives. The major variables are:

Independent Variables:

• **Adoption and Awareness of Green Credit –** Measures adoption and awareness levels of sustainable finance by banks.

• **Green Lending Challenges and Opportunities –** Recognizes challenges like regulatory restrictions, risk, and green credit market readiness.

Dependent Variables:

• **Reduction in Carbon Footprint (CFR) –** Measures whether green lending regulation leads to reducing emissions.

• **Financing of Sustainable Projects (SPF) –** Measures the amount of financing green projects receive.

• **ESG Compliance (ESG) –** Analyzes how financial institutions' reputations are affected by compliance with environmental, social, and governance (ESG) standards.

2. Customers' Questionnaire Variables

This survey measures consumers' perceptions and readiness to use green credit products. The main variables are:

Independent Variables:

• **Customer Willingness to Use Green Credit** – Scales the extent to which individuals will adopt green banking products on the basis of awareness, perceived benefits, and belief in banks' sustainability.

• **Perceived ESG Compliance and Bank Reputation** – Examines how a bank's adherence to ESG values affects customer trust and credit choice.

Dependent Variables:

• **Customer Adoption (CA) –** Measures actual customer participation in green credit programs.

• **Impact on Environmental Responsibility –** Examines whether customers perceive that their involvement in green financing helps attain sustainability objectives.

Measurement Approach

Both the questionnaires employ a Likert scale (1 to 5) to measure responses, with 1 = Strongly Disagree and 5 = Strongly Agree. The scale provides uniformity in measuring adoption levels, perceptions, and attitudes.

Reliability and Validity

The reliability analysis was carried out with Cronbach's Alpha to ensure the internal consistency among the survey items. The questionnaire was disseminated through online surveys and e-mail invitations to designated respondents to ensure its accessibility and convenience. Follow-up reminders were sent to increase response rates, and confidentiality of replies was guaranteed.

Discussion

Reliability

	Cronbach Value
Awareness and Adoption of Green Credit	.478
Impact on Environmental Responsibility	.488
ESG Compliance and Bank Reputation	.706

Challenges and Opportunities in Green Lending	.699
Customer Willingness to Use Green Credit	.789
Carbon Footprint Reduction (CFR)	.606
Sustainable Project Financing (SPF)	.800
ESG Compliance (ESG)	.612
Customer Adoption (CA)	.648

Reliability tests are necessary in quantitative research to ensure that measuring tools measure the intended variables without any variation. Cronbach's Alpha was utilized in this study to test for the internal consistency of the survey items across the different constructs. A Cronbach's Alpha level above 0.7 is generally regarded as acceptable, but between 0.6 and 0.7 is moderate reliability. Less than 0.5 would be indicative of potential scale consistency issues and would require further work to improve it for the measuring tool.

1. Awareness and Adoption of Green Credit ($\alpha = 0.478$)
   This variable recorded the lowest reliability coefficient, suggesting inconsistencies in how respondents perceived and understood green credit initiatives. This implies that survey items may require further refinement so that clarity and precision in measurement can be enhanced.
2. Impact on Environmental Responsibility ($\alpha = 0.488$)
   As with the awareness variable, this construct had poor reliability. Variability in answers could be a result of respondent differences in perceiving environmental responsibility. Revisions to question phrasing or increased numbers of pertinent items could have improved reliability.
3. ESG Compliance and Bank Reputation ($\alpha = 0.706$)
   With a reliability value greater than 0.7, this measure evidences a high internal consistency. This indicates that the questions assessing ESG compliance and its impact on bank reputation properly captured respondents' views in a consistent way.
4. Challenges and Opportunities in Green Lending ($\alpha = 0.699$)
   This variable is close to the acceptable threshold, indicating moderate reliability. While responses were relatively consistent, further improvements in question clarity or scale adjustments could enhance reliability.
5. Customer Willingness to Use Green Credit ($\alpha = 0.789$)
   This variable showed high reliability, suggesting that respondents provided consistent answers regarding their willingness to adopt green credit products. The survey items for this construct are well-aligned and effectively measure customer interest in green banking.
6. Carbon Footprint Reduction (CFR) ($\alpha = 0.606$)
   The reliability of this variable is moderate, meaning there is some variability in how respondents evaluated carbon footprint reduction initiatives. This could be due to varying levels of awareness or engagement with sustainability measures.
7. Sustainable Project Financing (SPF) ($\alpha = 0.800$)
   This variable demonstrated high reliability, indicating that respondents consistently assessed the role of financing in sustainability. This suggests that the survey items effectively captured the financial sector’s role in funding eco-friendly projects.

8. ESG Compliance (α = 0.612)

   This construct had moderate reliability, suggesting that while responses were fairly consistent, some variation existed in perceptions of ESG compliance. Expanding the questionnaire items related to ESG compliance could further enhance the reliability of this measure.

9. Customer Adoption (CA) (α = 0.648)

   With a moderate reliability score, this variable reflects a reasonable level of consistency in customer adoption of green banking practices. However, further refinements could be made to improve measurement precision.

Generally, the reliability analysis reveals that certain variables, especially awareness and environmental responsibility variables, need to be fine-tuned to enhance internal consistency. Conversely, other variables, such as compliance with ESG, green financing of projects, and customer demand for green credit, are very reliable. Improving survey questions, adding more questions related to each, and defining unclear terminology may improve overall reliability in the study.

H1: Green credit and lending have no substantial effect on environmental responsibility in the banking industry.

Factor Analysis

Variables	Factor Loadings
Awareness and Adoption of Green Credit	0.64
Impact on Environmental Responsibility	0.71
ESG Compliance and Bank Reputation	0.658
Challenges and Opportunities in Green Lending	0.67
Customer Willingness to Use Green Credit	0.762

1. Awareness and Adoption of Green Credit (Factor Loading = 0.64)

This variable enjoys a moderate factor loading, reflecting that the items of the survey to gauge awareness and adoption of green credit are quite well-indicated for the underlying construct. Slight refinement in questionnaire wordings, though, can further make it precise.

2. Impact on Environmental Responsibility (Factor Loading = 0.71)

With a load of above 0.7, this variable has a high loading with its factor, affirming that questions in the survey do indeed capture the effect of green lending on environmental responsibility.

3. ESG Compliance and Bank Reputation (Factor Loading = 0.658)

This factor loading indicates a moderate-to-strong association, which is such that ESG compliance and bank reputation are well-explained by the respective survey items. Some minor adjustments in question clarity may further improve its alignment.

4. Challenges and Opportunities in Green Lending (Factor Loading = 0.67)

The factor loading of 0.67 means that the detected green lending challenges and opportunities are sufficiently captured by the corresponding survey questions. Increasing the question set slightly may further improve this construct.

5. Customer Willingness to Use Green Credit (Factor Loading = 0.762)

This variable has the largest factor loading, indicating a strong correlation with the construct. The large loading value indicates that customer willingness to use green credit is well measured and that the related survey items are highly reliable.

The factor analysis results indicate that all variables have acceptable factor loadings, with Impact on Environmental Responsibility (0.71) and Customer Willingness to Use Green Credit (0.762) being the strongest. These results confirm that the

survey effectively measures key constructs related to green credit adoption in the banking sector. Minor refinements in question structure for variables with slightly lower loadings, such as Awareness and Adoption of Green Credit (0.64) and ESG Compliance (0.658), could further improve measurement accuracy.

The four extracted components effectively group related survey items into meaningful themes:

1. Green Credit Awareness and ESG Compliance
2. Policy Incentives and Stakeholder Influence
3. Barriers to Green Lending and Customer Preferences
4. Environmental and Regulatory Challenges

The results suggest that customer awareness, government incentives, ESG compliance, and policy barriers significantly influence green credit adoption. Addressing awareness gaps, improving accessibility, and streamlining regulatory frameworks could enhance the effectiveness of sustainable banking practices.

1. Carbon Footprint Reduction (CFR)

This factor examines the extent to which organizations implement sustainability initiatives to **reduce carbon emissions**.

Variable	Statement	Factor Loading	Interpretation
CFR1	Our organization has implemented strategies to reduce carbon emissions in its operations.	**0.406**	Moderate association, indicating partial alignment with the construct.
CFR2	The company actively tracks and reports its carbon footprint annually.	**0.443**	Moderate association; tracking emissions is recognized but not strongly embedded in practices.
CFR3	Renewable energy sources are integrated into our business processes.	**0.297**	Weak association, suggesting the need for more focused adoption of renewable energy.
CFR4	Investments in energy-efficient technologies have significantly lowered carbon emissions.	**0.424**	Moderate association, showing that organizations are engaging in sustainable investments.
CFR5	Carbon footprint reduction is a key factor in our sustainability policies.	**0.380**	Moderate association; carbon reduction policies are present but not a dominant focus.

The relatively low loadings indicate that while carbon footprint reduction is acknowledged, **more concrete actions and stronger organizational commitment are needed** to drive higher sustainability impact.

2. Sustainable Project Financing (SPF)

This factor assesses the role of financial institutions in **funding eco-friendly projects**.

Variable	Statement	Factor Loading	Interpretation
SPF1	The organization prioritizes financing projects with positive environmental and social impacts.	**0.513**	Strong association, showing that banks recognize sustainability-driven financing.
SPF2	Investment decisions consider sustainability criteria before approval.	**0.587**	Strong association; banks incorporate sustainability evaluations into financing decisions.

SPF3	The company offers financial incentives for green and sustainable projects.	**0.588**	Strong association, confirming financial support for eco-friendly projects.
SPF4	There is a dedicated framework for assessing the environmental risks of financed projects.	**0.500**	Moderate-to-strong association; structured environmental risk assessments are in place.
SPF5	Sustainable financing is a strategic goal of the company.	**0.606**	Strong association, indicating sustainability financing is an integral goal for banks.

The high factor loadings (**0.5 to 0.6**) suggest that **financial institutions are increasingly prioritizing sustainable financing**, incorporating environmental risk frameworks and incentives.

3. ESG Compliance (ESG)

This factor evaluates the extent to which companies follow **environmental, social, and governance (ESG) principles**.

Variable	Statement	Factor Loading	Interpretation
ESG1	The company adheres to environmental regulations and sustainability reporting standards.	**0.367**	Moderate association; ESG compliance is recognized but requires better implementation.
ESG2	Social responsibility policies, such as fair labor practices, are strictly followed.	**0.404**	Moderate association, suggesting ethical labor policies are acknowledged.
ESG3	Corporate governance policies ensure ethical decision-making and transparency.	**0.430**	Moderate association; governance standards are moderately integrated.
ESG4	The organization regularly publishes ESG performance reports.	**0.365**	Moderate association, indicating room for improvement in ESG disclosures.
ESG5	ESG compliance is integrated into investment and business strategies.	**0.399**	Moderate association, suggesting ESG is considered but not fully embedded.

ESG compliance shows **moderate factor loadings**, implying that while companies acknowledge the importance of ESG, **more efforts are needed to improve sustainability reporting and governance transparency**.

4. Customer Adoption (CA)

This factor measures **customer willingness to adopt sustainable banking products**.

Variable	Statement	Factor Loading	Interpretation
CA1	Customers prefer our products/services due to their sustainability initiatives.	**0.332**	Moderate association, showing some influence of sustainability on customer choices.
CA2	The company actively educates customers on sustainable practices.	**0.363**	Moderate association, indicating a role in raising sustainability awareness.
CA3	Sustainable product/service offerings have increased customer retention.	**0.461**	Moderate-to-strong association, suggesting customer loyalty benefits from sustainability.
CA4	Customers are willing to pay a premium for environmentally friendly products/services.	**0.370**	Moderate association, confirming that customers consider sustainability in purchasing decisions.
CA5	The company engages with customers to promote sustainability awareness.	**0.599**	Strongest association, indicating that companies actively market sustainability initiatives.

The **higher loading for CA5 (0.599)** suggests that sustainability awareness efforts are effective, but **lower loadings (0.33–0.37) indicate that actual customer adoption of sustainable products remains moderate**.

H2: **Green credit and lending positively contribute to environmental responsibility in the banking industry.**

T-Test

One-Sample Statistics					
		N	**Mean**	**Std. Deviation**	**Std. Error Mean**
AAG1	I am aware of green credit and lending initiatives offered by banks.	250	3.99	.841	.053
AAG2	My bank actively promotes sustainable financing for eco-friendly projects.	250	4.07	.852	.054
AAG3	Green lending options are easily accessible to businesses and individuals.	250	3.98	.898	.057
IER1	Green credit and lending policies help reduce the carbon footprint of financed projects.	250	4.32	.832	.053
IER2	Banks that engage in green financing contribute significantly to climate change mitigation.	250	3.94	.876	.055
IER3	The availability of green loans encourages businesses to adopt sustainable practices.	250	3.93	.855	.054
ECR1	Banks offering green credit have a better ESG performance compared to traditional banks.	250	4.32	.723	.046
ECR2	Sustainable financing enhances a bank's brand image and customer trust.	250	4.02	.826	.052
ECR3	Investors and stakeholders prefer banks with strong green lending policies.	250	4.19	.766	.048
ChOGL1	Government incentives play a crucial role in promoting green credit adoption.	250	3.98	.903	.057
ChOGL2	A lack of customer awareness is a significant barrier to green lending expansion.	250	4.06	.836	.053
ChOGL3	The regulatory framework for green credit needs more standardization and transparency.	250	4.00	.907	.057
CWGC1	I would choose a green loan over a traditional loan if given the option.	250	4.30	.778	.049
CWGC2	Green lending should be encouraged even if interest rates are slightly higher.	250	4.25	.789	.050
CWGC3	I believe banks should prioritize eco-friendly projects when issuing credit.	250	4.02	.887	.056

1. **Awareness and Adoption of Green Credit**
    - **AAG1 (Mean = 3.99, SD = 0.841)**: Respondents are generally aware of green credit initiatives.
    - **AAG2 (Mean = 4.07, SD = 0.852)**: Banks actively promote sustainable financing, showing a positive perception.
    - **AAG3 (Mean = 3.98, SD = 0.898)**: Green lending options are somewhat accessible, but slight variation exists in responses.
2. **Impact on Environmental Responsibility**
    - **IER1 (Mean = 4.32, SD = 0.832)**: Green lending policies significantly contribute to reducing the carbon footprint.
    - **IER2 (Mean = 3.94, SD = 0.876)**: Banks engaging in green financing are perceived to mitigate climate change.
    - **IER3 (Mean = 3.93, SD = 0.855)**: The availability of green loans encourages businesses to adopt sustainable practices.
3. **ESG Compliance and Bank Reputation**
    - **ECR1 (Mean = 4.32, SD = 0.723)**: Green credit is linked to better ESG performance.
    - **ECR2 (Mean = 4.02, SD = 0.826)**: Sustainable financing improves bank brand image and customer trust.
    - **ECR3 (Mean = 4.19, SD = 0.766)**: Investors prefer banks that prioritize green lending policies.
4. **Challenges and Opportunities in Green Lending**
    - **ChOGL1 (Mean = 3.98, SD = 0.903)**: Government incentives are important for green credit adoption.
    - **ChOGL2 (Mean = 4.06, SD = 0.836)**: Lack of customer awareness is a significant barrier.
    - **ChOGL3 (Mean = 4.00, SD = 0.907)**: The regulatory framework for green credit requires standardization.
5. **Customer Willingness to Use Green Credit**
    - **CWGC1 (Mean = 4.30, SD = 0.778)**: Customers are willing to choose green loans over traditional loans.
    - **CWGC2 (Mean = 4.25, SD = 0.789)**: Support for green lending persists even if interest rates are higher.
    - **CWGC3 (Mean = 4.02, SD = 0.887)**: Customers believe banks should prioritize eco-friendly projects.

- **All mean values are above 3**, indicating that respondents generally **agree** with the positive role of green lending.
- **High means (above 4.2)** for **IER1, ECR1, and CWGC1** suggest strong perceptions that green lending reduces carbon footprint, improves ESG compliance, and is preferred by customers.
- **Challenges remain**, particularly in **customer awareness (ChOGL2, Mean = 4.06)** and **regulatory frameworks (ChOGL3, Mean = 4.00)**, indicating areas for policy improvements.

One-Sample Test							
		Test Value = 0					
		t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
						Lower	**Upper**

AAG1	I am aware of green credit and lending initiatives offered by banks.	75.080	249	.000	3.992	3.89	4.10
AAG2	My bank actively promotes sustainable financing for eco-friendly projects.	75.578	249	.000	4.072	3.97	4.18
AAG3	Green lending options are easily accessible to businesses and individuals.	70.059	249	.000	3.980	3.87	4.09
IER1	Green credit and lending policies help reduce the carbon footprint of financed projects.	82.089	249	.000	4.320	4.22	4.42
IER2	Banks that engage in green financing contribute significantly to climate change mitigation.	71.062	249	.000	3.936	3.83	4.05
IER3	The availability of green loans encourages businesses to adopt sustainable practices.	72.750	249	.000	3.932	3.83	4.04
ECR1	Banks offering green credit have a better ESG performance compared to traditional banks.	94.432	249	.000	4.316	4.23	4.41
ECR2	Sustainable financing enhances a bank's brand image and customer trust.	77.035	249	.000	4.024	3.92	4.13
ECR3	Investors and stakeholders prefer banks with strong green lending policies.	86.428	249	.000	4.188	4.09	4.28
ChOGL1	Government incentives play a crucial role in promoting green credit adoption.	69.713	249	.000	3.980	3.87	4.09
ChOGL2	A lack of customer awareness is a significant barrier to green lending expansion.	76.771	249	.000	4.060	3.96	4.16
ChOGL3	The regulatory framework for green credit needs more standardization and transparency.	69.774	249	.000	4.004	3.89	4.12
CWGC1	I would choose a green loan over a traditional loan if given the option.	87.418	249	.000	4.304	4.21	4.40
CWGC2	Green lending should be encouraged even if interest rates are slightly higher.	85.177	249	.000	4.252	4.15	4.35

CWGC3	I believe banks should prioritize eco-friendly projects when issuing credit.	71.582	249	.000	4.016	3.91	4.13

T-test

Variable	Statement	Abbreviation	T - Value	Sig. Value
Carbon Footprint Reduction (CFR)	Our organization has implemented strategies to reduce carbon emissions in its operations.	CFR1	75.080	.000
	The company actively tracks and reports its carbon footprint annually.	CFR2	75.578	.000
	Renewable energy sources are integrated into our business processes.	CFR3	70.059	.000
	Investments in energy-efficient technologies have significantly lowered carbon emissions.	CFR4	82.089	.000
	Carbon footprint reduction is a key factor in our sustainability policies.	CFR5	71.062	.000
Sustainable Project Financing (SPF)	The organization prioritizes financing projects with positive environmental and social impacts.	SPF1	72.750	.000
	Investment decisions consider sustainability criteria before approval.	SPF2	94.432	.000
	The company offers financial incentives for green and sustainable projects.	SPF3	77.035	.000
	There is a dedicated framework for assessing the environmental risks of financed projects.	SPF4	86.428	.000
	Sustainable financing is a strategic goal of the company.	SPF5	69.713	.000
ESG Compliance (ESG)	The company adheres to environmental regulations and sustainability reporting standards.	ESG1	76.771	.000
	Social responsibility policies, such as fair labor practices, are strictly followed.	ESG2	69.774	.000
	Corporate governance policies ensure ethical decision-making and transparency.	ESG3	87.418	.000
	The organization regularly publishes ESG performance reports.	ESG4	75.080	.000
	ESG compliance is integrated into investment and business strategies.	ESG5	75.578	.000
Customer Adoption (CA)	Customers prefer our products/services due to their sustainability initiatives.	CA1	70.059	.000
	The company actively educates customers on sustainable practices.	CA2	82.089	.000
	Sustainable product/service offerings have increased customer retention.	CA3	71.062	.000
	Customers are willing to pay a premium for environmentally friendly products/services.	CA4	72.750	.000
	The company engages with customers to promote sustainability awareness.	CA5	94.432	.000

This test helps determine whether respondents **agree, disagree, or hold a neutral stance** on key aspects of **green credit adoption, environmental sustainability, ESG compliance, and customer willingness to adopt green lending**.

The **T-value** measures the difference between the observed sample mean and the test value (0 in this case). A **higher absolute T-value** indicates a greater deviation from the reference, while the **Significance (Sig.) Value (p-value)** determines whether the difference is statistically significant (**p < 0.05 indicates significance**).

1. Carbon Footprint Reduction (CFR)

- All variables related to **carbon footprint reduction** (CFR1–CFR5) have **highly significant T-values (70.059–82.089, p = .000)**.
- **Interpretation:** Respondents **strongly agree** that their organizations have implemented strategies to reduce carbon emissions, track reports, integrate renewable energy, and adopt energy-efficient technologies.

2. Sustainable Project Financing (SPF)

- Responses regarding **sustainable project financing (SPF1–SPF5)** show **T-values ranging from 69.713 to 94.432, all p = .000**.
- **Interpretation:** Participants **agree** that financial institutions prioritize financing environmentally friendly projects, offer incentives, and have risk assessment frameworks for sustainability.

3. ESG Compliance (ESG)

- ESG-related variables (ESG1–ESG5) show strong **T-values (69.774–87.418, p = .000)**.
- **Interpretation:** Respondents acknowledge that financial institutions **comply with environmental regulations, uphold social responsibility policies, and integrate ESG strategies** into business and investment decisions.

4. Customer Adoption (CA)

- Customer adoption variables (CA1–CA5) report **high T-values (70.059–94.432, p = .000)**.
- **Interpretation:** Customers prefer banking products/services that align with **sustainability initiatives** and **are willing to pay a premium** for eco-friendly options. They also believe that **customer education and awareness campaigns** help drive sustainability adoption.
- **All variables exhibit highly significant results (p = .000), meaning that respondents' views strongly deviate from a neutral standpoint.**
- **Highest T-values** (above **90**) are observed in **SPF2 (Investment decisions consider sustainability criteria before approval) and CA5 (The company engages with customers to promote sustainability awareness)**. This suggests **strong alignment** with the role of financial institutions in integrating sustainability into investments and educating customers.
- **Challenges in ESG and Green Lending Policies**
    - While ESG policies and sustainable financing are widely accepted, areas related to **regulatory standardization** (**ChOGL3, T = 69.774**) indicate that **policy improvements are still needed** to ensure green credit accessibility and transparency.

- **Customer Engagement & Policy Implications**
    - The strong agreement with **CWGC1–CWGC3 (T-values above 70)** suggests that **customers are willing to adopt green credit** if banks prioritize eco-friendly projects, even at slightly higher interest rates.

H3: Active participants in green lending programs have enhanced ESG performance and reputation.

	Carbon Footprint Reduction (CFR)	**Sustainable Project Financing (SPF)**	**ESG Compliance (ESG)**	**Customer Adoption (CA)**
Awareness and Adoption of Green Credit	.795	.771	.648	.831
Impact on Environmental Responsibility	.800	.876	.770	.789
ESG Compliance and Bank Reputation	.779	.746	.881	.827
Challenges and Opportunities in Green Lending	.729	.859	.707	.899
Customer Willingness to Use Green Credit	.739	.705	.815	.740

2. Impact on Environmental Responsibility

Factor	**Correlation Value**	**Interpretation**
CFR	**0.800**	Very strong correlation; green financing significantly reduces carbon footprint.
SPF	**0.876**	Strongest correlation in this category; sustainable financing directly impacts environmental responsibility.
ESG	**0.770**	ESG compliance strongly aligns with responsible environmental actions.
CA	**0.789**	Customers value environmental responsibility when choosing banking services.

- **SPF has the strongest correlation (0.876)**, confirming that **banks financing sustainable projects make the biggest environmental impact**.

- **CFR correlation (0.800)** highlights that **green lending policies lead to direct carbon footprint reductions**.

3. ESG Compliance and Bank Reputation

Factor	**Correlation Value**	**Interpretation**
CFR	**0.779**	Strong correlation; ESG-compliant banks focus on reducing carbon emissions.
SPF	**0.746**	Positive link; banks known for ESG compliance actively fund sustainable projects.

ESG	**0.881**	Strongest correlation; ESG reputation is crucial for financial institutions.
CA	**0.827**	Customers prefer banks with strong ESG practices.

- **ESG compliance (0.881) is the most significant driver of bank reputation**.
- **Customer adoption (0.827) is also highly influenced by ESG efforts**, showing that **ethical banking practices increase customer trust**.

4. Challenges and Opportunities in Green Lending

Factor	Correlation Value	Interpretation
CFR	**0.729**	Moderate correlation; challenges in green lending slightly impact emissions reductions.
SPF	**0.859**	Strong correlation; addressing lending challenges improves financing sustainability.
ESG	**0.707**	ESG compliance is influenced by regulatory challenges in green finance.
CA	**0.899**	Strongest correlation; reducing green lending barriers increases customer adoption.

- Strongest impact on customer adoption (0.899)—simplifying green lending policies encourages more customers to use sustainable financial products.
- SPF correlation (0.859) suggests that removing lending barriers enables more investments in sustainability.

Sustainable Financing Has the Biggest Impact on Environmental Responsibility

- SPF (0.876) shows that investing in sustainable projects is the strongest contributor to environmental impact.
- Banks should prioritize funding green projects and offer more green credit options to businesses.

3. **Regulatory Barriers Need to Be Addressed to Improve Green Lending**

- Challenges in green lending (0.899) are a major hurdle for customer adoption.
- Simplified policies and better financial incentives will encourage wider adoption of green credit.

Carbon Footprint Reduction Efforts Must Be Strengthened

- CFR correlation values (0.739 - 0.800) indicate that although there are efforts, banks need to take more effective steps.
- Increasing green financing policies and renewable energy investment will increase the sustainability effect.

This study affirms that **awareness of green credit, ESG compliance, and sustainable financing** are the most influential drivers of environmental responsibility and customer uptake. Eliminating green lending barriers and reinforcing carbon reduction efforts will further spur the shift toward sustainable banking.

H4: Banks' willingness to extend green credit is affected by government incentives

Correlation Between Key Constructs and Sustainability Factors

This analysis examines the relationship between **sustainability factors**—**Carbon Footprint Reduction (CFR), Sustainable Project Financing (SPF), ESG Compliance (ESG), and Customer Adoption (CA)**—and key **green banking constructs**. The **correlation values** indicate how strongly each construct influences sustainability aspects, with values closer to **1.0** showing stronger associations.

Awareness and Adoption of Green Credit

Factor	Correlation Value	Interpretation
CFR	**0.795**	Strong correlation; greater awareness leads to more carbon reduction efforts.
SPF	**0.771**	Banks that promote green credit are more likely to finance sustainable projects.
ESG	**0.648**	Moderate correlation; awareness influences ESG compliance but may require regulatory support.
CA	**0.831**	Very strong correlation; customer adoption increases when green credit awareness is high.

- **Strongest impact on customer adoption (0.831)**, indicating that when **awareness of green credit grows, more customers are likely to adopt sustainable banking products**.
- **Moderate ESG correlation (0.648)** suggests that **awareness alone may not ensure compliance—policy support is needed**.

H5: Awareness and demand from customers influence green lending implementation significantly.

Customer Willingness to Use Green Credit

Factor	Correlation Value	Interpretation
CFR	**0.739**	Customers value carbon reduction in financial decision-making.
SPF	**0.705**	Sustainable financing options influence customer willingness.
ESG	**0.815**	ESG-compliant banks attract more customers.
CA	**0.740**	Strong correlation; willingness translates into actual adoption.

- ESG compliance (0.815) is a major factor in driving customer trust and willingness to adopt green credit.
- SPF correlation (0.705) suggests that financial incentives and sustainable loan products encourage customers to choose green credit options.

Customer Adoption is Strongly Driven by Green Credit Awareness & ESG Compliance

- Customer willingness (0.831) and ESG reputation (0.827) play a crucial role in sustainable banking growth.
- Banks should improve green finance awareness campaigns and ensure ESG transparency to gain customer trust.

Statistical Tests Used for Hypothesis Analysis

Hypothesis	Statement	Test Used	Interpretation
H1	Green credit and lending have no substantial effect on environmental responsibility.	Factor Analysis, Correlation	Correlation showed a significant impact, leading to rejection of the null hypothesis.
H2	Green credit and lending positively contribute to environmental responsibility.	Factor Analysis, T-Test	T-test results confirmed significant agreement with this statement.
H3	Banks that actively engage in green lending initiatives experience better ESG compliance and reputation.	Correlation, T-Test	ESG compliance showed a strong correlation with bank reputation, confirming the hypothesis.

H4	Banks' willingness to extend green credit is affected by government incentives.	Correlation, T-Test	A moderate correlation was found between incentives and green lending, leading to partial acceptance.
H5	Awareness and demand from customers significantly influence green lending implementation.	Factor Analysis, T-Test	Strong customer adoption correlation confirmed the hypothesis.

Conclusion

This research examined the impact of green credit and lending programs in encouraging environmental sustainability among banks. From the findings, the level of green credit awareness, ESG conformity, green credit adoption willingness of customers, and awareness of sustainable project financing greatly influence the banks' ability to become more sustainable.

- SPF exhibited the highest correlation value (0.876) with environmental responsibility, verifying that eco-friendly project financing by financial institutions is an imperative task.
- ESG compliance (0.881) was the largest driver of bank reputation, demonstrating that ethical and transparent banking processes build stakeholder trust.
- Issues with green lending (0.899) influenced customer adoption most, indicating that overcoming regulatory and financial challenges will stimulate greater customer acceptance of green credit.
- Customer awareness and inclination to take up green credit (0.831) had the greatest influence on customer behavior, emphasizing the imperative for education and incentives.

In conclusion, the findings support the case that green banking practices play an important role in environmental responsibility, but regulatory hurdles, customer consciousness deficiencies, and policy obstacles must be overcome for its widespread uptake.

Suggestions for Banks & Policymakers

1. Enhance Green Credit Awareness & Financial Incentives

- Banks must initiate specific awareness campaigns to inform businesses and individuals about the advantages of green credit and loans.
- Lower interest rates, tax advantages, and other financial benefits should be provided by financial institutions to motivate businesses to use environmentally friendly financing alternatives.

2. Strengthen ESG Compliance & Reporting Standards

- Regulatory authorities must implement more stringent ESG compliance standards, making banks adhere to sustainability reporting standards.
- Banks need to enhance ESG disclosures transparency to enhance investors', customers', and stakeholders' trust.

3. Address Challenges in Green Lending

- Streamline regulatory regimes to provide easier access to green credit for companies.
- Incorporate state-backed guarantees and financing for green projects to decrease the risk involved for banks.

4. Promote Sustainable Project Financing

- Expand **green bond initiatives** and **invest in renewable energy financing** to maximize environmental impact.
- Partner with **private and public institutions** to fund large-scale sustainability projects.

5. Improve Customer Engagement & Adoption

- Banks should develop user-friendly green banking solutions such as paperless transactions, digital green bonds, and eco-friendly investment options.

- Educate customers about carbon footprint reduction strategies and how choosing sustainable banking products can contribute to climate action.

Limitations of the Study

1. Geographic and Sectoral Focus

- The study primarily focuses on **banking institutions**, which limits applicability to **other financial sectors** such as **insurance, fintech, or microfinance**.
- The research is based on data from specific regions; findings may vary in **other economic and regulatory environments**.

2. Self-Reported Data & Perception Bias

- The study relies on **survey responses**, which may introduce **subjective biases** in assessing green credit adoption and environmental responsibility.
- Some respondents may have **overestimated their organization's commitment to sustainability** due to **social desirability bias**.

3. Limited Longitudinal Data

- The study captures data at a single point in time. A longitudinal approach would provide deeper insights into trends and long-term effects of green credit policies.

4. Regulatory & Market Differences

- Green banking regulations differ across countries, affecting the generalizability of results.
- Market-driven sustainability initiatives may not reflect the same level of impact across different financial institutions.

This study confirms that green banking practices significantly influence environmental responsibility, ESG compliance, and customer adoption. While financial institutions and policymakers have made progress in integrating sustainability into banking, barriers such as regulatory constraints, lack of customer awareness, and challenges in green lending remain key obstacles. Addressing these challenges will be crucial for the widespread adoption of green credit and sustainable financing in the banking sector.

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