

Green Banking and the Financial Performance of the Banking Sector of Pakistan

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Abstract

Climate change is one of today's most complex and pressing issues. People are increasingly aware of global warming and its far-reaching impacts on human life. This concern extends to various stakeholders, including governments, direct polluters, and financial institutions. Among these institutions, banks play a pivotal role in societal development. While banking operations may not have direct environmental implications, they are significantly influenced by the ecological awareness of their customers. Green Banking, also known as Ethical Banking, involves initiatives undertaken by banks to protect the environment. Banks can also diminish their carbon footprints by adopting paperless banking, implementing energy-efficient practices, utilizing mass transportation systems, and incorporating solar energy systems. The objective of this study is to ascertain the benefits of Green Banking and its impact on FP. We have examined all banks in the Pakistani banking sector from 2013 to 2022 to achieve this goal. Green Banking practices are evaluated as the key variable. At the same time, FP is assessed using Return on Assets (ROA) and Tobin's Q. Our findings reveal a robust and statistically significant relationship between Green Banking and the FP of banks, as measured by both ROA and Tobin's Q.

Keywords: Green banking practices, financial performance, Tobin's Q, employee-related green banking practices, daily operation-related practices, Customer-related green practices, and green banking bank policy.

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1 Introduction

GB is described by the United Nations Environment Program as "enhancing the allocation of bank capital to green assets, demonstrating institutional leadership through public commitments, establishing new industry-wide Green Banking guidelines, gaining broader endorsement for international voluntary principles, and executing specific rule and supervisory measures", according to (Lacy et al., [2018](#)). According to 67% of CEO studies, the global economy is not up to the difficulties posed by sustainability-related problems. The banking industry is a major contributor to encouraging ecologically friendly and sustainable investing, sometimes known as "green banking" (Bukhari et al., [2020](#)). Manufacturers and commercial projects are encouraged to implement a suitable environmental management system through these environmental and sustainable investment programs, enabling them to utilize the right technologies (Jabeen et al., [2022](#)).

It is noteworthy that while banking operations may not have significant direct environmental effects, they do have significant indirect effects (Burns et al., [2014](#)). Through their financing and innovations, banks have the potential to influence sustainable enterprises to the fullest extent possible. Creating and sustaining the green revolution to rescue the earth can be viewed as a strategic role by banking and financial organizations. Banks can assist various environmental activities by offering green loans, green bonds, or sustainable bonds to fund environmentally friendly initiatives such as solar-powered buildings, renewable energy projects, and eco-friendly infrastructure (Miah et al., [2021](#)).

The banking industry provides a significant percentage of the funding for numerous firms and industries, which places a great deal of accountability and duty on the banks (Khan et al., [2024](#)). Banks may indirectly cause environmental damage if they fail to recognize or assess possible ecological implications (Golo et al., [2024](#)). Additionally, bank decision-makers must act sustainably because the banking sector is essential to boosting the future economy. By preserving the environment and upholding societal norms, this behavior indicates concern for both short-term and long-term economic performance (Usenko & Zenkina, [2016](#)).

1.1 Scope of the study

The research aims to help Pakistani financial institutions promote and engage in GB as an integral part of their day-to-day operations. Additionally, the study aims to demonstrate to financial institutes the advantages of GB. It is suggested that this study concentrate.

Related to green banking and establishing a solid framework for how Pakistani financial institutes should adopt it. The study is meant to assist the central bank in formulating plans for

How banks can implement green banking practices and serve as a regulatory authority.

The study aims to educate various stakeholders, including employees, shareholders, and clients, regarding the advantages of GB or how they can actively advocate for it within their respective banks. Academicians can use it to expand their knowledge of the field, and researchers can use it as a point of reference to conduct additional studies in the area.

1.2 Research Objective

To establish the connection between (GB) and the financial performance of banks in Pakistan.

1.3 Research Question

What is the connection between Pakistan's banking sector's financial performance and green banking?

1.4 Problem Statement

According to the State Bank of Pakistan's 2017 publication of GB standards, which were influenced by the Pakistan Environmental Protection Act of 1997, GB is a relatively young and underdeveloped idea in Pakistan. The most significant influencing elements for implementing

GB practices in Pakistan have been attempted to be explained in a study (Shafique & Majeed, [2020](#)). The study's conclusions show that the primary variables in Pakistan's adoption of GB are policy guidelines, attitude towards usage, central bank regulations, and impact bankers' aim.

As an underdeveloped market, Pakistan faces the problems of scar resourcing in particular and environmental degradation at large. Regardless of the guidelines from SBP, the banking environment in Pakistan is still facing many problems with the adoption and implementation of GB. Most of the research in the Pakistani context focuses on indicators of the implementation of green banking (GB), and only a few have sought to gauge the advantages of GB regarding the profitability and overall performance of the banking sector. As the banking business, like other businesses, is inclined towards profit maximization thus, this study will focus on the latter question. The findings of this research may encourage the banking sector to adopt Green banking, which not only improves the banking industry's contribution to GDP but also removes environmental concerns.

1.5 Research Gap

The analysis of pertinent literature has improved the underlying comprehension and knowledge needed to give this study significance and purpose. In earlier investigations, according to a study (Khan & Szegedi, [2019](#)), the banking sector plays a substantial role in the Pakistani economy and holds the potential to mitigate environmental concerns significantly. Pakistan today has significant environmental dangers, so banks may help lessen these risks by implementing green banking practices, including using environmental standards for lending (Ellahi et al., [2023](#)).

GB practices may encompass various initiatives, such as the adoption of energy-efficient lighting and solar energy and the digitization of offices to decrease paper-based processes (Khan et al., [2023](#)). Examine green banking practices, how they affect Pakistan's Islamic banks' reputation, and the moderating impact of workers' environmental awareness on banks' reputations. Since issuing the Green Banking (GB) guidelines, the banking sector in Pakistan has begun integrating GB practices into its daily operations and financial activities (Ghaazi et al., [2024](#)).

Most research on measuring GB practices as predictors of banks' FP has been conducted in foreign areas like India, Bangladesh, China, and Western nations. However, relatively few research examined the sustainability of banking in Pakistan about their evaluation of green banking practices. The measurement of green banking practices and FP are new challenges in global organization management that are being researched simultaneously. As a result, after identifying this vacuum in the literature, the current study, which is also noteworthy, looks into the association and effects between green banking practices and the FP of Pakistan's banking industry. It is a worthwhile effort to close the gap, and adding a ten-year data period and a larger sample size will boost the accuracy and applicability of the findings. Therefore, considering the relationship between green banking practices and financial success over 10 years with an expanding sample size will significantly contribute to the research.

2 Literature Review

2.1 Theoretical Background

Because so many trees need to be cut down and deforestation would eventually occur, the main valuation made in the overview phase of GB was to limit paper consumption in banking operations. This detrimental action causes the air to become more carbon dioxide-rich and less oxygen-rich. GB refers to controlling banking operations in areas in a manner that contributes to an overall reduction in both internal and external carbon emissions. Banks should lend money to projects that do not encourage pollution, are environmentally benign, or have plans to mitigate the negative consequences of pollution (Chaurasia, [2014](#)).

Ecology is the scientific examination of how living organisms interact with their environment. GB is a facet of developmental ecology that analyses the beneficial interactions or reciprocal linkages between development and the environment or living things. There are many differences between green banking and traditional banking, including the weight and emphasis green banks put on environmental factors. Green banks struggle to endorse ethical environmental and social business practices. Before approving a loan, they consider all relevant factors, including how the project will affect the environment in the future (DuPlain et al., [2008](#)). The banks must create suitable environmental management systems to assess the risks associated with the investment projects to achieve environmental risk. The risks can be internalized by using varying interest rates and other strategies.

Additionally, banks can stop funding projects with a high degree of risk. The second dimension of green banking involves creating financial services and solutions that promote environmentally friendly economic growth. Bonds and mutual funds designed for environmental investments are among them, as these investments encompass projects related to renewable energy, biodiversity preservation, energy efficiency, cleaner production processes, and more (Bihari & Pradhan, 2011). GB, also known as moral banking or supportable banking, is governed by the same experts but has a different goal of protecting the environment (Jha & Bhome, [2013](#)). GB shares similarities with conventional banking in that it considers social, environmental, and ecological aspects. Society faces the most challenging aspects of climate change. These days, more people are aware of worldwide warming and its harmful impacts on the quality of people's living style. Therefore, regulations must be altered to ensure the environment's long-term sustainability because doing so is essential to human survival (Nath et al., [2014](#)).

GB, which includes green finance, significantly facilitates the shift towards low-carbon, resource-efficient sectors and green industries. Comparable to traditional marketing, "greening" in social marketing promotes incorporating elements that offer economic, social, and environmental advantages when delivering value. This includes identifying green attitudes and behaviors that can be leveraged in developing green concepts and products (Rai et al., [2019](#)).

2.2 Green Banking and Financial Performance

Strategies for green banking have two parts. The first is risk management for the environment, and the second is finding prospects for new financial products that are ecologically conscious. Banks must have appropriate Environmental management systems employed to evaluate the environmental risks linked to investment projects, aiming to mitigate and manage environmental risks effectively. The risks can be internalized by using varying interest rates and other strategies. Additionally, banks can stop funding projects with a high degree of risk. These include bonds and mutual funds for environmental investments (Bihari & Pradhan, [2011](#)). FP refers to the overall financial health and stability of a company. It encompasses various metrics that assess whether a company is operating well or poorly financially. Some key indicators include profitability, liquidity, solvency, financial efficiency, and the ability to meet repayment obligations. Profitability is a significant metric that evaluates how effectively a company generates income from its use of capital, labor, land, and management. It can be measured through metrics like ROA, return on equity, and operational profit margin (Greenwood & Jovanovic, [1990](#)).

2.3 Hypothesis Development

H1: *FP is improved by green banking practices.*

There are the following sub-hypotheses of our study

H1b: *Impact of green banking practices on the FP of Islamic and commercial banks in Pakistan*

H1c: *The Effect of Employee-Related Practices on the FP of the Banking Sector in Pakistan.*

H1d: *The Influence of Daily Operation-Related Practices on the FP of the Banking Sector in Pakistan.*

H1e: *Impression of Customer-related practices on the FP of the banking sector in Pakistan.*

H1f: *The Effect of Banking Policy-Related Practices on the FP of the Banking Sector in Pakistan.*

2.4 Framework

The framework we have selected for our thesis is given below.

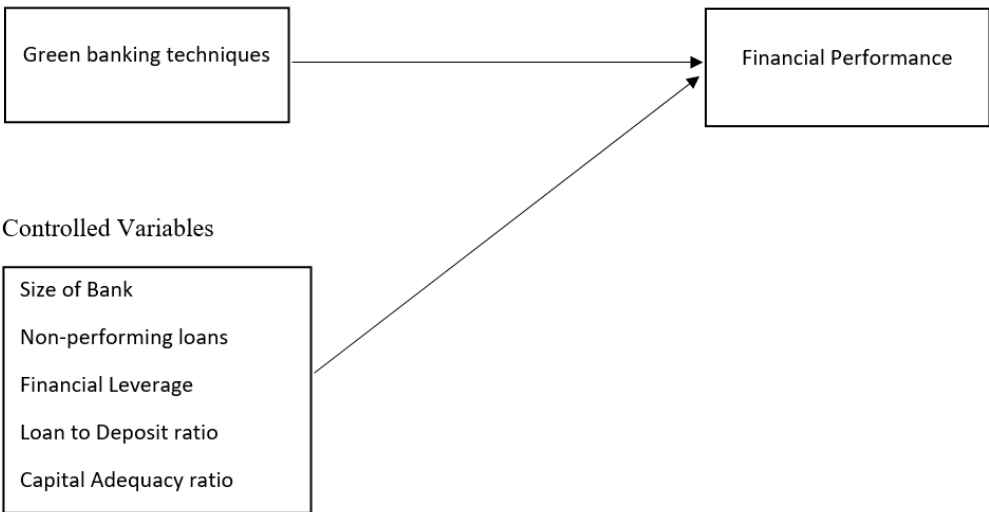


Figure 1: Framework

3 Methodology

To achieve the objectives of the study, specific research methods need to be employed. Therefore, this chapter is dedicated to delineating the research methodology. It encompasses the research design employed, the study's target population and sample, the methodology for selecting the sample, the data source, techniques for data collection, and the analytical tools used to establish relationships between independent and dependent variables.

3.1 Data and Source

The research framework comprises one independent variable, one dependent variable, and five control variables. Green banking is our independent variable, and FP is the dependent variable. Size, Loan deposit ratio, Non-performing loans, capital adequacy, and financial leverage are control variables. Our data collection source is secondary. We are collecting data from the annual reports. Our target industry is the banking sector of Pakistan. The sampling period for our research is from 2013 to 2022, and we collect data yearly, which is also a unique point because previous researchers considered one or two years, so we are covering that limitation as well.

3.2 Time Horizon

Longitudinal studies are made of observations or facts accrued throughout time. This takes an aspect of employing a longitudinal approach to research Green banking through the manner of the financial sector (banks) in Pakistan from 2013 to 2022. The inquiry shall use a longitudinal method to decide the connection among the variables indexed.

3.3 Research Method

The goal populace and the statistics supply affect the method's appearance. The shape of statistics is essential for the appearance of step one of the study procedure. The installed objectives alter the appearance of step one of the methods throughout time, which determines statistics series techniques. Descriptive and exploratory study techniques are used within the investigations (Burns & Groove, 2014).

3.4 Research Approach

The study method is selected and finished in the dreams of the inquiry. The most common intellectual techniques are deductive reasoning and inductive reasoning. Deductive reasoning is a factor of view held via the analysis of a fact-based totally at the convergence of more than one typically time-honored premise. Deductive reasoning entails tactics alongside description, explanation, interpretation, and sympathetic reasoning to obtain a result. Inductive reasoning, conversely, generates conclusions based totally on normal hypothesis understanding strategies that move from specific to generalization.

3.5 Variable Measurement

Using annual reports of all banks of Pakistan, 16 indicators of GB in banks and the FP of banks were measured.

3.6.1 Operationalization

Operationalization of variables shows a more detailed overview of the variables and their measurements. Each is described below:

Table 1: Operationalization

Variables	Definition	Measurement	References
Green Banking (GB)	GB, which stands for eco-friendly or environmentally responsible banking, aims to combat environmental degradation and contribute to a more hospitable planet.	$GB = \sum_{i=1}^n di$	Shaumya and Arulrajah, 2016, December. Measuring green banking practices: Evidence from Sri Lanka. In the <i>University of Sri Jayewardenepura, Sri Lanka, 13th International Conference on Business Management (ICBM)</i> .
ROA	A company's capacity to turn a profit while using all of its resources or assets is gauged by the profitability ratio known as ROA.	ROA = profit after tax / total assets	Ibrahim, S.S., 2017. The impacts of liquidity on profitability in banking sectors of Iraq: A Case of Iraqi Commercial Banks. <i>International Journal of Finance & Banking Studies</i> (2147-4486), 6(1), pp.113-121.
TOBINS Q	Tobin's q refers to the ratio of a physical asset's market value to its replacement value.	Market Value of Bank / Book Value of Equity	Al Karim, R. and Alam, T., 2013. An evaluation of the FP of private commercial banks in Bangladesh: Ratio analysis. <i>Journal of Business Studies Quarterly</i> , 5(2), p.65.
Size of bank	In this study, the company's size is determined by the total assets it possesses.	Bank Size = Logatharam of Total Size	Siahaan, C., Silalahi, A.S., Syahyunan, S. and Sianipar, A.S., 2021. Analysis of Green Banking Sustainability And FP Implementation Towards

			Profitability of Banking Listed On The Indonesia Stock Exchange In 2012-2018. <i>Journal Of Management Analytical and Solution (JoMAS)</i> , 1(1), pp.1-12.
Non-performing Loan	Non-performing loans are characterized as loans that have remained unpaid for ninety days or longer.	Non-performing loan=non-performing loans / total aggregate (including consumer, housing, auto, credit cards, and other loans)	Vatansever, M. and Hepsen, A., 2013. Determining impacts on non-performing loan ratio in Turkey. <i>Journal of Finance and Investment Analysis</i> , 2(4), pp.119-129.
Financial leverage	Describe the correlation between the proportion of a company's total assets funded by creditors (debt) and the portion funded by owners (equity).	Total liabilities / Equity.	Zelalem, D., 2020. The impact of financial leverage on the performance of commercial banks: Evidence from selected commercial banks in Ethiopia. <i>International Journal of Accounting, Finance and Risk Management</i> , 5(1), pp.62-68.
Loan-to-deposit ratio	Liquidity refers to the risk faced by a bank's earnings and capital due to its inability to meet obligations promptly when they mature without incurring excessive losses. A frequently utilized metric for evaluating a bank's liquidity is the ratio of its total loans to its total deposits.	LTD=Loans/Deposits	Alzorqan, S. "Bank liquidity risk and performance: an empirical study of the banking system in Jordan." <i>Research Journal of Finance and Accounting</i> , 5 (12): 155 64 (2014).
Capital adequacy ratio	CAR, or Capital Adequacy Ratio, is a measure of a bank's capacity to supply additional funds in case of financial difficulties and the bank management's competence in identifying, quantifying, overseeing, and managing risks that could impact capital adequacy.	Tier 1 Capital + Tier 2 Capital / Risk Weighted Assets	Rafique, A., Quddoos, M.U., Akhtar, M.H. and Karim, A., 2020. Impact of financial risk on the FP of banks in Pakistan; the mediating role of capital adequacy ratio. <i>Journal of Accounting and Finance in Emerging Economies</i> , 6(2), pp.607-613.

3.7.2 Green Banking

The paper focuses on green banking (GB) and its effect on FP in Pakistan's banking industry, including the 16-item tool from (Azam et al., [2024](#)), which is based on stakeholder (Duplin, [2008](#)) theory. The cardinal features are employee-related, daily operation-related, customer-related, and policy-related practices. GB is evaluated through annual reports, explicitly looking into sentences that diagnose 16 conditions, such as environmental training, performance assessment, paperless method, energy-efficient equipment, and green loans. The dichotomy (1

for presence, 0 for absence) avoids subjectivity. Moreover, the bank’s green banking dimensions given by this formula are synthesized, considering social, ecological, and economic dimensions aiming for environmental sustainability.

$$GB = \sum_{i=1}^n di$$

3.7.3 Financial Performance

FP is a dependent variable, and we use ROA and Tobin’s Q ratio to measure dependence. The profitability ratios known as ROA gauge a company's capacity to profit while using all of its properties or assets. In contrast, Tobin's Q measures market-based FP.

4 Results and Discussion

4.1 Descriptive Statistics

Descriptive statistics portray the fundamental characteristics of data within a study. They offer concise overviews of the sample and its measurements. These statistics underpin nearly all quantitative data analyses along with straightforward graphical analysis. Descriptive statistics are utilized to present quantitative descriptions in a manageable format, aiding in the simplification of extensive datasets coherently. Each descriptive statistic condenses substantial amounts of data into a more concise summary. In this descriptive analysis, statistical measures such as mean, standard deviation, and correlation are computed and logically presented in alignment with the study's objectives.

Table 2: Descriptive statistics

Variables	N	Mean	Median	Std. Dev.	Min	Max
ROA	272	.005	0.008	.018	-.079	.051
Tobin Q	204	1.126	0.951	0.72	-0.308	3.756
GB Index	272	.236	0.063	.267	0	.75
Size	272	19.594	19.868	1.536	15.26	22.07
Non-performing Loan	263	.137	0.087	.163	.008	.781
Financial leverage	272	15.427	14.149	15.707	-28.126	108.422
Loan to Deposit ratio	272	3.518	0.561	14.35	0.041	82.985
Capital Adequacy	272	14.888	15.475	18.779	-80.04	97.61
Islamic Banks	272	.221	0.000	0.415	0	1
Commercial Banks	272	0.746	1.000	0.436	0	1

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

To initially understand the variables and their relationships, we used Stata to analyze descriptive statistics and correlations. Table 4.1 provides a brief description of summary statistics. "Regarding descriptive results, the mean ROA value is 0.005, with a maximum of 0.51 and a minimum of -0.079, accompanied by a standard deviation (SD) of 0.018. The mean Tobin Q value is 1.126, with a maximum of 3.756, a minimum of -0.308, and an SD of 0.72. For the independent variable, the mean value of the Green Banking Index across the entire banking sector is 0.236, with a maximum of 0.75, a minimum of 0, and an SD of 0.267. The average bank size is 19.594, with a maximum of 22.07 and a minimum of 15.26, with an SD of 1.536. The mean Non-performing Loan (NPL) ratio is 0.137, with a maximum of 0.781 and a minimum of 0.008, accompanied by an SD of 0.163. The mean financial leverage is 15.427, with a maximum of 108.422, a minimum of -28.126, and an SD of 15.707. The mean Loan-to-Deposit Ratio (LDR) is 3.518, with a maximum of 82.985, a minimum of 0.041, and an SD of 14.35. The mean

Capital Adequacy Ratio (CAR) is 14.888, with a maximum of 97.61 and a minimum of -80.04, with an SD of 18.779. Additionally, the mean value for Islamic banks is 0.221, with a maximum of 1 and a minimum of 0, and an SD of 0.415. Meanwhile, the mean value for commercial banks is 0.746, with a maximum of 1 and a minimum of 0, along with an SD of 0.436."

4.2 Correlation

Table 3: Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) ROA	1.00									
(2) Tobin Q	0.25*	1.00								
(3) GB Index	0.01	-0.13	1.00							
(4) Size	0.39*	0.13	0.34*	1.00						
(5) Non-performing loans	-0.56*	-0.09	-0.27*	-0.60*	1.00					
(6) Financial leverage	0.05	0.42*	-0.03	0.21*	-0.14*	1.00				
(7) Loan to deposit ratio	0.24*	-0.18*	-0.15*	-0.43*	0.29*	-	1.00			
(8) capital adequacy ratio	0.34*	0.21*	-0.03	0.09	-0.56*	0.05	0.07	1.00		
(9) Islamic banks	0.12*	0.19*	0.17*	0.06	-0.21*	-	-0.06	0.04	1.00	
(10) Commercial banks	0.13*	0.06	0.17*	0.37*	-0.51*	0.04	-0.31*	0.10	0.31*	1.00

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

In Table 3, results identified positive sign values for positive associations. On the other hand, a negative sign value indicates a negative association. Tobin Q, green banking practices, bank size, financial leverage, Loan deposit ratio, capital adequacy ratio, and green banking practices of Islamic and commercial banks positively correlate with ROA. On the other hand, non-performing loans are negatively correlated with ROA.

Size of bank, financial leverage, capital adequacy ratio, green banking practices of Islamic and commercial banks are positively correlated with Tobin Q. Green banking practices of overall banking sector, non-performing loans, Loan to deposit ratio are negatively correlated with Tobin Q. Size of bank and green banking practices of Islamic and commercial banks are positively correlated with green banking index. Non-performing loans, financial leverage, Loan to deposit ratio, and capital adequacy ratio negatively correlated with the green banking index. Financial leverage, capital adequacy ratio, and green banking practices of Islamic and commercial banks are positively related to the size of the bank. Non-performing loans and loan-to-deposit ratios are negatively correlated with the size of the bank. Loan to deposit ratio is positively correlated with non-performing loans.

Financial leverage capital adequacy ratio green banking practices of Islamic and commercial banks negatively correlate with non-performing loans. Capital adequacy ratio and green banking practices of commercial banks are positively correlated with financial leverage. The loan-to-deposit ratio and the green banking practices of Islamic banks are negatively correlated with financial leverage. The capital adequacy ratio is positively correlated with the loan-to-deposit ratio. Green banking practices of Islamic and commercial banks are negatively correlated with Loan to deposit ratio. Capital adequacy ratio is positively correlated with ROA, Tobin Q, bank size, financial leverage, and green banking practices of Islamic and commercial banks.

4.3 Empirical Results

This session discusses the empirical results, which are concluded through regression analysis.

4.3.1 Impact of Green Banking Practices on Financial Performance

i. Impact of green banking practices on financial performance using ROA

Table 4: Impact of green banking practices on FP using ROA

Variables	ROA (1)	ROA (2)
Green Banking Index	0.016*** (2.600)	0.007 (1.491)
Size of bank		0.005*** (7.947)
Non-performing loans		-0.040*** (-3.629)
Financial Leverage		-0.000 (-1.576)
Loan-to-deposit ratio		0.001*** (5.581)
Capital Adequacy ratio		0.000** (2.347)
Constant	0.004 (1.388)	-0.082*** (-7.595)
Observations	272	263
R-squared	0.069	0.652

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 4, we explored the relationship between green banking practices and the FP of the banking sector using ROA as a key indicator of FP. ROA is a measure of a business's capability to generate profit on the assets it employs. This also reflects the efficiency of the company's top management in asset allocation. In Table 4.3, the green banking index shows 0.016***, a strongly significant statistical value using ROA as a measure of FP without the effect of control variables. Green banking index shows 0.007 insignificant statistical value using ROA with the effect on control variables. Size of bank 0.005***, Non-performing loans -0.040***, Loan to deposit ratio 0.001***, Capital Adequacy ratio 0.000**, Constant -0.082*** significant, while Financial Leverage show -0.000 insignificant statistical value. The value of R-squared 0.652 means a proxy of 65% supporting the results.

ii. Impact of green banking practices on financial performance using Tobin's Q

Table 5: Impact of Green Banking Practices on FP using Tobin's Q

Variables	Tobin's Q (1)	Tobin's Q (2)
Green Banking Index	0.782*** (2.959)	0.525** (2.076)
Size of Bank		0.172*** (3.599)
Non-performing loans		0.944** (2.246)
Financial Leverage		0.019*** (5.924)
Loan to Deposit ratio		-1.120*** (-3.395)
Capital Adequacy ratio		0.009*** (2.976)
Constant	1.534*** (7.293)	-1.988* (-1.826)
Observations	204	203
R-squared	0.235	0.554

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 5, we explored the relationship between green banking practices and the FP of the banking sector using Tobin Q as a key indicator of FP. Tobin's Q model measures the market-based performance of firms. In Table 4.4, the green banking index shows 0.782*** strongly significant statistical value using Tobin Q as a measure of FP, and Constant shows 1.534*** strongly significant value with Tobin Q without the effect of control variables. The green banking index shows 0.525** significant statistical value using Tobin Q with the effect on control variables. Size of bank 0.172***, Non-performing loans -0.944**, Financial Leverage 0.019***, Loan to deposit ratio -1.120***, Capital Adequacy ratio 0.009***, strongly significant while Constant -1.988* significant, statistical value. The value of R-squared 0.554 means a proxy of 55%, supporting the results.

- iii. Impact of green banking practices on the financial performance of commercial banks using Return on assets

Table 6: Impact of green banking practices on the FP of commercial banks using ROA

Variables	ROA (1)	ROA (2)
Green Banking Index	-0.014 (-0.986)	0.009 (1.152)
Commercial Banks	-0.002 (-0.398)	-0.001 (-0.206)
c.gen_index#c.com_bank1	0.036** (2.423)	-0.002 (-0.376)
Size of Bank		0.005*** (7.983)
Non-performing loans		-0.041*** (-3.319)
Financial Leverage		-0.000 (-1.575)
Loan to Deposit ratio		0.001*** (5.473)
Capital Adequacy ratio		0.000** (2.311)
Constant	0.006 (1.169)	-0.082*** (-7.236)
Observations	272	263
R-squared	0.126	0.653

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 6, we explored the relationship between green banking practices and the FP of commercial banks using ROA as a key indicator of FP. In Table 4.5, the green banking index of commercial banks shows 0.036** significant statistical value using ROA as a measure of FP, and the Constant shows 0.006 insignificant value with ROA without the effect of control variables. The green banking index of commercial banks shows -0.002 insignificant statistical value using ROA with the effect on control variables. Size of bank 0.005***, Non-performing loans -0.041***, Loan to deposit ratio 0.001***, Capital Adequacy ratio 0.000**, and Constant -0.082*** strongly significant while Financial Leverage shows -0.000 insignificant statistical value. The value of R-squared 0.653 means a proxy of 65% supporting the results.

- iv. Impact of green banking practices on the financial performance of commercial banks using Tobin's Q

Table 7: Impact of Green Banking Practices on the FP of commercial banks using Tobin's Q

Variables	Tobin's Q (1)	Tobin's Q (2)
Green Banking Index	0.243 (0.644)	0.869** (2.409)
Commercial Banks	-0.101 (-0.536)	0.469*** (4.225)
c.gen_index#c.com_bank1	0.616 (1.533)	-0.339 (-0.959)
Size of Banks		0.186*** (4.237)
Non-performing loan ratio		1.904*** (3.613)
Financial Leverage		0.020*** (6.010)
Loan to Deposit ratio		-1.221*** (-3.871)
Capital Adequacy ratio		0.016*** (4.208)
Constant	1.617*** (5.220)	-2.815*** (-2.745)
Observations	204	203
R-squared	0.242	0.590

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 7, we explored the relationship between green banking practices and the FP of commercial banks using Tobin Q as a key indicator of FP. In 6, the green banking index of commercial banks shows 0.616 insignificant statistical value using Tobin Q as a measure of FP and the Constant shows 1.617*** strongly significant value with Tobin Q without the effect of control variables. The green banking index of commercial banks shows -0.339 insignificant statistical value using Tobin Q with the effect on control variables. Size of bank 0.186***, Non-performing loans 1.904***, Financial Leverage 0.020***, Loan to deposit ratio -1.221***, Capital Adequacy ratio 0.016***, and Constant -2.815*** strongly significant statistical value. The value of R-squared 0.590 means a proxy of 59%, supporting the results.

- v. Assessing the Influence of Green Banking Practices on the Financial Performance of Islamic Banks through the ROA Measurement

Table 8: Impact of Green Banking Practices on the FP of Islamic Banks Utilizing ROA.

Variables	ROA (1)	ROA (2)
Green Banking Index	0.011* (1.671)	0.005 (1.092)
Islamic Banks	-0.001 (-0.598)	-0.001 (-0.957)
Green banking index of Islamic banks	0.018*** (3.068)	0.007** (2.140)
Size of Banks		0.005*** (7.754)
Non-Performing loans		-0.040*** (-3.664)
Financial Leverage		-0.000 (-1.560)
Loan to Deposit ratio		0.001*** (5.499)
Capital Adequacy ratio		0.000** (2.245)

Constant	0.005 (1.377)	-0.081*** (-7.230)
Observations	272	263
R-squared	0.087	0.654

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 8, we explored the relationship between green banking practices and the FP of Islamic banks using ROA as a key indicator of FP. In Table 4.7, the green banking index of Islamic banks shows 0.018*** strongly significant statistical value using ROA as a measure of FP and Constant shows 0.005 insignificant value with ROA without the effect of control variables. The green banking index of Islamic banks shows 0.007** significant statistical value using ROA with the effect on control variables. Size of bank 0.005***, Non-performing loans -0.040***, Loan to deposit ratio 0.001***, Capital Adequacy ratio 0.000** and Constant -0.081*** strongly significant while Financial Leverage shows -0.000 insignificant statistical value. The value of R-squared 0.654 means a proxy of 65% supporting the results.

vi. Impact of GB practices on the financial performance of Islamic banks using Tobin's Q

Table 9: Impact of Green Banking Practices on the FP of Islamic banks using Tobin's Q

Variables	Tobin's Q (1)	Tobin's Q (2)
Green Banking Index	0.381 (1.595)	0.087 (0.431)
Islamic Banks	-0.249 (-1.380)	0.010 (0.068)
Green banking index of Islamic banks	1.629*** (4.193)	1.216*** (3.578)
Size of Bank		0.168*** (3.629)
Non-performing loans		0.694* (1.696)
Financial Leverage		0.020*** (6.250)
Loan to Deposit ratio		-1.127*** (-3.307)
Capital Adequacy ratio		0.008*** (2.643)
Constant	1.570*** (7.352)	-1.860* (-1.781)
Observations	204	203
R-squared	0.312	0.635

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 9, we explored the relationship between green banking practices and the FP of Islamic banks using Tobin Q as a key indicator of FP. In Table 4.8, the green banking index of Islamic banks shows 1.629*** strongly significant statistical value using Tobin Q as a measure of FP and Constant shows 1.570*** strongly significant value with Tobin Q without the effect of control variables. The green banking index of Islamic banks shows 1.216*** strongly significant statistical value using Tobin Q with the effect on control variables. Size of bank 0.168***, Financial Leverage 0.020***, Loan to deposit ratio -1.127***, Capital Adequacy ratio 0.008***, strongly significant statistical value, while Non-performing loans 0.694*, and -1.860* are significant statistical value. The value of R-squared 0.635 means a proxy of 63%, supporting the results.

vii. Impact of Employee-related green banking practices on financial performance using ROA

Table 10: Effect of Employee-related green banking practices on FP using ROA.

Variables	ROA (1)
Employee-related green banking practices	0.008*** (3.897)
Size of bank	0.003*** (6.420)
Non-performing loans	-0.042*** (-3.937)
Financial Leverage	-0.000* (-1.774)
Loan to Deposit ratio	0.001*** (5.274)
Capital Adequacy ratio	0.000*** (3.905)
Constant	-0.057*** (-5.357)
Observations	294
R-squared	0.605

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 10, we explored the relationship between Employee-related green banking practices and FP using ROA as a key indicator of FP. In Table 4.9, Employee-related green banking practices show 0.008*** strongly significant statistical value using ROA as a measure of FP. Size of bank 0.003***, Non-performing loans -0.042***, Loan to deposit ratio 0.001***, Capital Adequacy ratio 0.000*** and Constant -0.057*** strongly significant while Financial Leverage show -0.000* significant statistical value using ROA as FP. The value of R-squared 0.605 means a proxy of 60% supporting the results.

viii. Impact of Daily operation-related Green Banking Practices on Financial Performance Using ROA

Table 11: The Influence of Daily Operation-Related Green Banking Practices on FP Utilizing ROA.

Variables	ROA (1)
Daily operation-related green banking practices	0.007*** (3.787)
Size of bank	0.003*** (5.420)
Non-performing loans	-0.045*** (-4.271)
Financial Leverage	-0.000* (-1.922)
Loan to Deposit ratio	0.001*** (5.098)
Capital Adequacy ratio	0.000*** (3.883)
Constant	-0.047*** (-4.379)
Observations	294
R-squared	0.602

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 11, we explored the relationship between daily operation-related green banking practices and FP using ROA as a key indicator of FP. In Table 4.10, Daily operation-related green banking practices show 0.007*** strongly significant statistical value using ROA as a

measure of FP. Size of bank 0.003***, Non-performing loans --0.045***, Loan to deposit ratio 0.001***, Capital Adequacy ratio 0.000*** and Constant --0.047*** strongly significant while Financial Leverage show -0.000* significant statistical value using ROA as FP. The value of R-squared 0.602 means a proxy of 60% supporting the results.

ix. Impact of customer-related Green banking practices on financial performance using ROA

Table 12: Impact of customer-related Green banking practices on FP using ROA

Variables	ROA (1)
Customer-related green banking practice	0.007*** (3.736)
Size of bank	0.003*** (5.901)
Non-performing loans	-0.047*** (-4.465)
Financial Leverage	-0.000** (-2.071)
Loan to Deposit ratio	0.001*** (5.118)
Capital Adequacy ratio	0.000*** (3.724)
Constant	-0.050*** (-4.707)
Observations	294
R-squared	0.603

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 12, we explored the relationship between Customer-related green banking practices and FP using ROA as a key indicator of FP. In Table 4.11, Customer-related green banking practices show 0.007*** strongly significant statistical value using ROA as a measure of FP. Size of bank 0.003***, Non-performing loans --0.047***, Loan to deposit ratio 0.001***, Capital Adequacy ratio 0.000*** and Constant --0.047*** strongly significant while Financial Leverage show -0.000** significant statistical value using ROA as FP. The value of R-squared 0.603 means a proxy of 60% supporting the results.

x. Impact of Bank policy-related green banking practices on financial performance using ROA

Table 13: Impact of Bank Policy-related Green Banking Practices on FP Using ROA

Variables	ROA (1)
Bank policy-related green banking practices	0.006*** (3.015)
Size of bank	0.003*** (5.588)
Non-performing loans	-0.044*** (-4.150)
Financial Leverage	-0.000* (-1.724)
Loan-to-deposit ratio	0.001*** (5.071)
Capital Adequacy ratio	0.000*** (3.953)
Constant	-0.048***

	(-4.516)
Observations	294
R-squared	0.595

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 13, we explored the relationship among the Bank policy-related green banking practices on FP using ROA as a key indicator of FP. In Table 4.12, Bank policy-related green banking practices show 0.006*** strongly significant statistical value using ROA as a measure of FP. Size of bank 0.003***, Non-performing loans --0.044***, Loan to deposit ratio 0.001***, Capital Adequacy ratio 0.000*** and Constant --0.048*** strongly significant while Financial Leverage show -0.000* significant statistical value using ROA as FP. The value of R-squared 0.595 means a proxy of 59% supporting the results.

- xi. Impact of Employee-related green banking practices on financial performance using Tobin's Q

Table 14: Impact of Employee-related Green Banking Practices on FP using Tobin's Q

Variables	Tobin's Q (1)
Employee-related green banking practices	0.261** (2.141)
Size of bank	0.191*** (4.382)
Non-performing Loan	0.916** (2.060)
Financial Leverage	0.020*** (5.889)
Loan to Deposit ratio	-1.054*** (-3.254)
Capital Adequacy ratio	0.009*** (2.991)
Constant	0.009*** (-2.380)
Observations	203
R-squared	0.551

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 14, we explored the relationship between Employee-related green banking practices and FP using Tobin's Q as a key indicator of FP. In Table 4.13, Employee-related green banking practices show 0.261** significant statistical value using Tobin's Q as a measure of FP. Size of bank 0.191***, Financial Leverage show 0.020***, Loan to deposit ratio -1.054***, Capital Adequacy ratio 0.009*** strongly significant while Non-performing loans --0.044***, and Constant 0.009*** significant statistical value using Tobin's Q as FP. The value of R-squared 0.551 means a proxy of 55%, supporting the results.

- xii. Influence of Daily operation-related green banking practices on financial performance using Tobin's Q

Table 15: Impact of Daily operation-related green banking practices on FP using Tobin's Q

Variables	Tobin's Q (1)
Daily operation-related green banking practices	0.251** (2.426)
Size of bank	0.171***

	(3.730)
Non-performing Loan	0.817*
	(1.765)
Financial Leverage	0.019***
	(5.706)
Loan-to-deposit ratio	-1.082***
	(-3.373)
Capital Adequacy ratio	0.009***
	(2.793)
Constant	-1.983*
	(-1.879)
Observations	203
R-squared	0.556

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 15, we explored the relationship among the Daily operation-related green banking practices on FP using Tobin's Q as a key indicator of FP. In Table 4.14, Daily operation-related green banking practices show 0.251** significant statistical value using Tobin's Q as a measure of FP. Size of bank 0.171***, Financial Leverage show 0.019***, Loan to deposit ratio -1.082***, Capital Adequacy ratio 0.009*** strongly significant while Non-performing loans 0.817*, and Constant -1.983* significant statistical value using Tobin's Q as FP. The value of R-squared 0.556 means a proxy of 55% supporting the results.

xiii. Impact of customer-related Green banking practices on financial performance using Tobin's Q

Table 16: Impact of Customer-related Green Banking Practices on FP using Tobin's Q

Variables	Tobin's Q (1)
Customer-related green banking practices	0.074
	(0.690)
Size of bank	0.189***
	(4.072)
Non-performing Loan	0.495
	(1.114)
Financial leverage	0.020***
	(5.789)
Loan-to-deposit ratio	-1.100***
	(-3.317)
Capital Adequacy ratio	0.008**
	(2.570)
Constant	-2.248**
	(-2.094)
Observations	203
R-squared	0.541

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 16, we explored the relationship between Customer-related green banking practices and FP using Tobin's Q as a key indicator of FP. In Table 4.15, Customer-related green banking practices show 0.074 insignificant statistical value using Tobin's Q as a measure of FP. Size of bank 0.189***, Financial Leverage show 0.020***, Loan to deposit ratio -1.100***, Capital Adequacy ratio 0.008** and Constant -2.248** significant while Non-performing loans 0.495 insignificant statistical value using Tobin's Q as FP. The value of R-squared 0.541 means a proxy of 54%, supporting the results.

xiv. Impact of Bank policy-related green banking practices on financial performance using Tobin's Q

Table 17: Impact of Bank policy-related green banking practices on FP using Tobin's Q

Variables	Tobin's Q (1)
Bank policy-related green banking practices	0.106 (1.004)
Size of bank	0.186*** (4.004)
Non-performing loans	0.615 (1.313)
Financial leverage	0.020*** (6.018)
Loan-to-deposit ratio	-1.092*** (-3.342)
Capital Adequacy ratio	0.009*** (2.751)
Constant	-2.227** (-2.101)
Observations	203
R-squared	0.542

*Robust t-statistics in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

In Table 17, we explored the relationship among the Bank policy-related green banking practices on FP using Tobin's Q as a key indicator of FP. In Table 4.16, Bank policy-related green banking practices show 0.106 insignificant statistical value using Tobin's Q as a measure of FP. Size of bank 0.186***, Financial Leverage show 0.020***, Loan to deposit ratio -1.092***, Capital Adequacy ratio 0.009*** and Constant -2.227** significant while Non-performing loans 0.615 insignificant statistical value using Tobin's Q as FP. The value of R-squared 0.542 means a proxy of 54%, supporting the results.

5 Conclusion

The study is brought to a close by providing comprehensive responses to the research questions initially posed in Chapter 1, thereby achieving the research objectives. Building upon the findings of this study, recommendations are provided regarding the implementation of green banking practices and their impact on the FP of Pakistan's banking sector. Additionally, the study discusses its limitations and offers suggestions for future research endeavors. "In the following section, the study summarizes the key points addressing the research questions. The primary objective of this research was to identify green banking (GB) practices and ascertain the relationship between these practices and the FP of the banking sector in Pakistan. The research findings indicate that GB fosters environmentally friendly practices and diminishes carbon emissions stemming from banking activities. These practices take various forms, including the adoption of online banking instead of traditional branch banking, online bill payments, the utilization of online banks for CDs and money market accounts, and support for various green initiatives, encompassing mobile banking, internet banking, ATM card usage, credit card services, and online fund transfers. Green banking (GB) plays a pivotal role in creating efficient, time-saving, user-friendly banking services and offers a comprehensive market-based solution to address a spectrum of environmental issues, including climate change, deforestation, air quality concerns, and biodiversity loss. Concurrently, it identifies and secures opportunities that benefit banking customers.

5.1 Policy Implications

- Banking enterprises can do strenuous work on education and CSR to inform internal and

external customers of the essence of professional banking.

- Set a separate budget for the green investment programs because, in addition to increasing financial returns and an ecologically friendly environment, such measures mark a definite breakthrough in green banking.
- The Central Bank must conscientiously make the banks aware of their role in financializing the environmental sustainability of their policies and give a plan for transitioning from regular to green banking.
- The supervisory bodies have to set up monitoring mechanisms to ensure that green banking practices are followed and impose penalties for non-compliance. The government should use this study's insights to create appropriate policies and enlighten the masses widely concerning environmentally friendly practices.

5.2 Managerial Implication

- The Pakistan banking sector has obstacles in the way of its attainment of environmental sustainability, and it should formulate measures that involve 3sgp finance, ecology, and economy dimensions.
- The institutional framework of Pakistan has not yet formed integrated rules for green banking, and only a few initiatives have emerged. By contrast, the countries of India, China, Bangladesh, Indonesia, and the USA have many green banking apps like green loans, mortgages, etc. This shows that many countries have put more effort into controlling pollution and conserving energy.
- Following a 'green' agenda is beneficial from both ecological and social standpoints and the business involved. The key commercial banks in Pakistan should be inclined towards environmentally conscious policies. That is with due emphasis on the sustainability of growth by transferring their norms from countries like Brazil, Bangladesh, and Nigeria, whose regulations highlight the banking sector's influence on the environment.
- Banks can engage on this path in similar ways by supporting their customers in mitigating climate change risks. They can do this by implementing robust environmental management systems, giving priority credit for environmental projects, adopting good risk management practices, integrating the green strategy for business, offering environment-friendly products/services, and strengthening green human resource management.

5.3 Limitation and Future Research

- Future research should include an analysis of the larger samples and additional attributes, considering the views of the Pakistani banks in the study alone; it should also elaborate on the performance of other financial institutions and elements of the economy.
- Return to a certain topic and local areas after a period to examine the process of green banking, specifically its adaptation to government regulations. Study subjects like demographic changes and green banking influencing factors and their implications for financial results.
- Study the relationship between green banking practice and residents' features, how fresh practices affect investors, and their probable role in forecasting Corporate Social Responsibility (CSR) results.
- Further research could entail the search for other proxies, such as the Green Banking Disclosure Index, and incorporate a qualitative approach, which would help to retrieve

more comprehensive input from respondents, paying attention to the current limitations and the guidelines proposed by Rasheed et al. (2023) as well as quantitative research.

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