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Green Banking Practices, Sustainable Environmental Performance and Profitability of Commercial Banks

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Abstract

The growing focus on environmental sustainability has prompted financial institutions to promote environmentally friendly practices in their operations. Green banking in this regard has become a significant strategy by which commercial banks can help in protecting the environment and still be viable financially. This research paper has found that there is association amongst green banking practices, sustainable environmental performance and profitability of commercial banks. In addition, the main purpose of the study to examine the effects of green banking practices on the environmental performance of commercial banks and whether the practices lead to higher rate of profitability. The research design is quantitative and the primary data used in the research is a structured questionnaire. Moreover, the survey involved 300 respondents who were members of commercial banking institutions. Partial Least Squares Structural Equation Modeling (PLS-SEM) is used to analyze the relationships between the study variables. The green banking practices are measured using a number of indicators such as green banking policies, daily operations that are environmentally responsible, and green investment initiatives. The most important study outcome variables are the environmental performance and profitability that are employed in assessing the success of green banking programs in commercial banks. Furthermore, the research results indicate that green banking activities have a strong positive impact on sustainable environmental performance and profitability of commercial banks. Besides, the findings indicate that banks with environmentally friendly policies and practices in their operations do not only help in ensuring environmental sustainability, but also enhance their financial performance and corporate image. These results have significant implications on banking institutions, policymakers, and regulatory bodies in ensuring sustainable banking practices in the financial sector. Moreover, the research paper adds to the body of literature on the subject of green finance by highlighting the importance of commercial banks in promoting sustainable economic growth.

Keywords:

Introduction

The financial institutions, particularly commercial banks have the decades' old history since the emergence of human beings on the planet earth. The main purpose of the commercial banks is to facilitate every customer instead of class differentiation either an individual or an entrepreneur through their prime products and services to fulfill their financial requirements accordingly. In the contemporary time is all about digital transformation and borderless growth. It is primarily is carried out through innovative commercial banking operations and services to invigorate the process of socio-economic development of the different under-developing nations. The growing importance of environment sustainability has introduced environment friendly-initiatives in the commercial banking institutions of the different countries. It has changed the overall vision and working patterns of commercial banks from profitability towards green banking practices. The green banking practices refers to that commercial banking operations that introduce the different green strategies to promote environment sustainability initiatives along with banking financial activities. Its main purpose is to reduce the consumption level of carbon-based practices in the financial institutions. It is considered as the crucial and innovative strategy to create sustainable and eco-friendly development into the different regulated and non-regulated financial institutions. The concept and practice of green banking have introduced in earlier decade to address environment problems and create knowledge of environment sustainability. It is pondered as the important approach to identify the process of sustainability-based development and create knowledge and effective understanding pertinent to environmental responsibility. It is having crucial importance in the financial literature because it is viewed as the extended branch of digital banking. The digital banking is quite different in its very features, functions and forms. It is fundamentally focusing to create comfort and convenience through the modern and innovative banking solutions of the contemporary times. While green banking system is having its own characteristics, which has created the integrated concept between smoothness and the protection of environment sustainability. The green banking always having its own purpose to reduce the operational expenditure which takes place in normal business operations, create value-addition and decrease the rate of different risk factors to improve the scale of business profitability. It is understood that the modern approach of commercial banking is not only to increase business profitability, but also achieve socio-economic objectives. The different governments and private stakeholders are taking keen interest to introduce different unique initiatives to create and promote the system of green banking at different levels. But at some extent there is scarcity of information and understanding about sustainable environment practices with respect commercial banking. According to the State Bank of Pakistan (SBP), the main purpose of green banking is to create and promote environmental, social and governance (EGS) to protect and preserve the order of natural resources. The economic growth of a country primarily depends upon the innovative ideas and creative opportunities which produce long term sustainable economic growth. The different financial institutions have introduced the unique green banking products and services such as green financing particularly green loans and the main purpose of these loans is promote eco-friendly and sustainable initiatives that's is green credit cards, online mobile banking and branchless banking to minimize the paperwork and maximize online digital transactions. In response, all these initiatives improve the environment sustainability and preservation of natural resources. According to old and current Environmental, Social, and Governance (ESG) priorities, the environment sustainability is the most important priority in the Environmental, Social, and Governance (ESG) grid ranking system. It is fact that the financial institutions having their own Environmental, Social, and Governance (ESG) criteria and ranking system. Its main purpose is to create and improve the financial performance of the different financial institutions through the diverse Environmental, Social, and Governance (ESG) measures and eco-friendly commercial banking practices. Either financial institution is either public or private. Both, the former and the latter need to create eco-friendly measures to implement environment sustainable strategies to create environment sustainable practices in normal routine commercial banking practices. However, there is still a long way to go to achieve the purpose of sustainable banking practices in developing countries. The attention has increased related to environment problems throughout the world for all sectors especially financial institutions to adopt and promote environment friendly strategies to go and run green besides day to day operations. It is the most important obligation for financial institutions and profitable making organizations to tackle every environment related challenge like their own problems from their own perspectives. Environment is affected by regular banking operations. It is more influenced by the behavior of banking customers that create greater impact on environment. The financial institutions promote environment sustainable initiatives in their regular operations for long term investments plans. In response, green financing investments create green cleaning and renewable energy sources to reduce the impact of carbon emissions. The previous research is carried out to explore the impact of green banking practices on environment sustainability amongst all the tigers of organization to achieve environment friendly objectives through green financing. This system in which green measures which improve environment related performance has not been center of attention as an important research gap for the research experts. Green banking is having significant importance in the current research arena. It has enabled the financial institutions particularly commercial banking institutions need to promote environment sustainable objectives. Many research experts have worked on banking sector and its commercial practices. Only a few has studies have focused the association between the impact of green banking practices on environment sustainability. It is understood that there is dearth of research studies on the impact of green banking practices on environment preservation and protection. In developing countries, particularly in Bangladesh, green banking practices as services are pondered as the fascinating task which improves social and economic elegance. There are a few important challenges that restrict the implementation of these services i.e. cyber challenge, financial challenge, individual challenge, time-frame challenge and induvial challenge. These a set of challenges undesirably affect the overall behavior of banking client towards green banking products and services. The system of green banking practices in Bangladesh is improved by the Bangladesh Bank that has created and offered clear cut guidance for all scheduled bank of the country. These green banking practices in Bangladesh experienced problems and opportunities that is implementation of environment related factors, conducive policy formulation and the improvement of digital online financing and banking services. The government regulated commercial banks and specialized financial institutions have revealed inadequate results and productivity in introducing green banking. A few banks have adopted and implemented the notion of green banking as an effective system to reduce operational costs, profitability and preservation of environment. Some of financial institutions are reluctant to adopt green banking practices as sustainable measures. The few developed countries are European countries are introducing and promoting the green sustainable economic practices to tackle the numerous problems related to environment sustainability and preservation of natural ecosystem. It is observed that in European countries are facing problems to introduce the green principles due to some reasons. The mean value of the developed countries has been decreased with the passage of time. It is understood that there is decreasing trend in prompting of green practices amongst financial institutions. Developing a well-developed green economy needs effective green policies and different plans that is eco-friendly innovation, the free transference of information pertinent to environment protection and sustainability, efficient access to financial institutions, reformatory taxation and government expenditure system. This study contributes to the existing content on green banking, green finance, bank environmental performance, sustainability, and bank profitability in numerous important ways. It reveals both theoretical and practical insights into different green banking practices that are based on bankers' understanding within commercial banks. It explores the big research gap by investigating green banking practices and their impact for bank profitability through the mediating role of sustainable environmental performance in commercial banks of Pakistan. Its main purpose is to find and evaluate the mediating role of two variables that is daily operations and green investments with respect to green banking projects in green banking policy and the environmental performance of different commercial banks. It finds the that is green banking measures improve the overall profitability of commercial banks through banking environmental effectiveness.

Literature Review & Hypothesis

Green Banking Policies & Daily Operations

The affect of green banking practices on customer retention in which effective green banking measures always increase retention of customers that directly or indirectly enhance the financial sector in present and future times. There is significant effect on the retention of customers. The government should introduce essential measures to ensure the promotion of green banking practices in the different developing countries particularly Pakistan, India and Bangladesh. It is observed that effective and sustainable green banking policies invigorates the banking sector of the country. In developing countries, the customer always gives desired priority to green banking practices so that the management of banking should implement effective measures to promote green culture into existing organization culture. The green banking practices always creates multiple benefits for banking institutions that is information and image of banks a among the minds of old and new customers. The different financial institutions and banks are keen interested to create environment related policies to promote eco-friendly banking system. The developing Asian countries are facing challenges related to create and implement green banking policies in existing banking structures. A few Asian countries are having the feeble green banking system and their current population is completely unacquainted about green banking practices in the state-owned and private banking institutions of the country. Because these financial institutions are still in developing phase pertinent to green banking measures and their customers are not having sufficient understanding about these types of schemes. The banking employees who are working in the different financial institutions and banks reveal their ideas that the green banking practices and eco-friendly measures can be strengthened through the proper involvement of government and their effective greening plans and policies which can improve the overall performance of banking sector. There is the greater demand of green banking practices in the commercial financial institutions of the country. Due to different factors, the most important factor is the proper involvement of top management and huge spending to promote green banking measures in commercial banks. The premise is taken from the numerous evidences that there are various measures needs to introduced to improve the performance of green banking practices in commercial banks. The Asian developing countries are still lagging behind in this cut throat competition on the account of reluctance of people about green banking practices. A few countries are trying to improve their banking performance through numerous greening measures that is promotion of proper knowledge about green banking system and its environmental benefits for population and banking sector. The current position and status of Asian developing countries is very deficient. The government and private stakeholders are trying hard to improve and promote greening banking practices to preserve their natural eco-system and profitability of banking operations.

H1-There is significant impact of green banking policy on daily operations in the commercial banks.

Green Banking Policies & Green Investments

The different developing countries are adopting the green banking practices and measuring the scale of green banking practices among customers. It is empirically proved that green banking practices has greater influence on commercial banking practices and has not significant effect on customer re-orientation in some cases. The banking institutions are face the different problems on the account of customers not having sufficient understanding about green banking practices and green banking investments in eco-friendly projects. There is association between the effectiveness of green economy and the efficiency of interrelated technologies which are being discussed in every corner. The socio-economic mismatch has greatly reduced the overall growth green practices in developing and undervaluing countries. In this aspect, the systematic execution of long-term sustainability in both developing and under developing countries requires proper governance and collaboration in energy, environment and development related aspects. It is found that the more effective usage of green banking practices and facilities are used in the young customers than octogenarian or middle-aged old customers. During the pandemic, the worth and the scope of banking sector has been increased to facilitate customers during the crisis through the modern unique methods. It is understood that the different research evidences have proved that green banking has changed the overall structure of everything. The role of green banking practices can be increased when the unfamiliar population will be catered through different value propositions.

H2-There is significant impact of green banking policy on green banking investments in the commercial banks.

Daily Operations & Environmental Performance

The overall perception of internal banking stakeholders about the green banking practices in the Asian developing countries have revealed that the internal stakeholders of banking institutions have positive approach and priorities towards adaptation of green banking practices. There many factors that affect the overall behavior of internal stakeholders of banking institution that is effective green banking policies that improve the all sustainable environment in order to increase the old and new customer retention. It is empirically recommended that the green banking practices must emphasis on the promotion of different methods that is internet banking, mobile banking, environment friendly green plastic cards which are composed different recyclable plastic materials that cannot be used again. These types of eco-friendly measures reduce the more operational and environmental costs and make banking institutions to be more efficient to become paperless and go green in their daily operations.

H3-There is significant impact of daily operations on the bank's environment related performance in the commercial banks.

Green Investments in Green Projects & Bank Performance

The different empirical evidences have explored that the level of attentiveness and intention of customers for green banking practices have revealed that the customers are very conscious and full of information about the green banking products and services. It is explored that the response and feedback of customers pertinent to green banking services during the era of pandemic, they have shared their overall experience about the green banking measures that have been conducive on the account of effective implementation of policies and the proper financing investments in the environment friendly initiatives. The scale of customer satisfaction about green banking measures. They have shared their feedback that previous initiatives have been implemented just to promote and create the basic understanding about green banking practices have been incomplete. So new measures must be carried out to improve the overall infrastructure of green banking practices in the commercial banking sector. It is shown that the overall contribution of green banking practice in the development of environment sustainability and proved that the green banking products and services are very important for the promotion of eco-friendly environment of the country.

H4-There is significant impact of green projects on the environment performance in the commercial banks.

Environment Performance & Profitability

The concept of environment performance is defined that a set of initiatives and measures that create green practices to promote the preservation of environment sustainability. The idea of profitability of organization is calculated through return of assets. The capability of an organization to create profitable operations on the total amount of assets is known as return on assets (ROA). Most of the developing countries are adopting the green banking system to increase the environment related performance of commercial banks.

In developing countries, most of the banking institutions are putting a lot of efforts to improve the overall performance of their financial sector through adopting green banking practices. The well-developed countries particularly in Europe have created an effective strategy to generate financial resources to increase the scale of sustainable development that is comprising on well-established environment related standards. Its main purpose is to measure ecological and sustainable economic activities besides creating an effective system for green bonds. In Europe, Green Deal is created to judge the additional framework and standards for increasing the reporting of environment sustainability and regulating ESG disclosures. The main purpose of green banking practices is to promote environment related effectiveness not only in the premises of private organization but also outside in the process of policy making system of country. Its main focus is to increase the overall environment related performance along with green project financing. However, the overall performance of these policies is confined to a few challenges that is weak project matching and information imbalance between climate innovators, stakeholders and private investors. It is understood that an effective performance of environment system always creates significant impact on the scale of profitability. During the lockdown, the overall impact of pandemic on the green banking practices and non-financial institutions have increased the scope of as well as growth of green banking system. It is meant that green banking practices have created positive footprints in the developing countries.

H5: There is significant impact of environmental performance of bank on the profitability in the commercial banks.

Green Banking Policies & Environment Performance of Bank

The different banking institutions are facing the numerous challenges in adopting and promoting of green banking practices to predict the prospects with respect to present and future times. Many commercial banks are vigorously taking efforts to improve the scope of green banking system and its facilities. However, most of the people are facing the different problems while, using the facilities of green banking practices in their normal routine. In response, they have reduced their interest and become ignorant about the benefits of green banking practices. The main reasons behind the affecting the system of green banking practices in is the developing countries. It is revealed that most of the banking institutions are needed to introduce effective measures to execute the policy mechanism of green banking practices throughout the different developing countries. Green banking practices have created numerous effects on the environment related performance in the developing countries. According to findings, it is revealed that the banking institutions need to implement rigorous measures to invigorate the idea and application of green banking practices for regular operations in effective manner. The overall effect of environment related practices that is training, energy saving practices and many others pertinent to daily practices of green banking. The fundamental purpose of green banking practices must be shared with people so that they can create good sense of understanding about the functions and benefits of green banking practices in their daily life. The different conceptual models have been designed about green banking practices and their overall effects on the environment related performance of banking institutions.

H6: There is significant impact of green banking policy on environment related performance of commercial banks.

Mediating Importance of Environment Sustainable Performance of Banks between Green Banking Policy & Profitability

Performance is defined as how an organization is using its competitive set of skills to achieve its desired opportunities which are present in the existing market to meet its organizational goals. It is also perceived to be the outcome and result of the organizational units and activities to achieve organization goals. In addition, the performance of the banks can be associated with different aspects that is competitiveness, financial stability, the operating efficiency, productivity, and profitability. The main indicator or dimension of performance is defined as the capability of the organization to generate profits through using effective and efficient usage of the organizational operations and resources. There are a number of research evidences which indicate the different green banking policies that are increasing the level of profitability and adding value in the banking operations. At the same time, it also creates some unfavorable impact on the profitability of banking operations. Nonetheless, the other studies confirm that green banking policies have a considerable impact on profitability.

H7: There is a significant impact of green banking policy and profitability through sustainable environment performance of commercial bank.

Theoretical Foundation

The green banking policy creates a framework or a pre-defined regulating system that promote the concept, green practices and environment sustainability that directly as well as indirectly protect the natural eco-system of the banking institutions and the planet earth. In the context of banking institutions, the top management is creating and implementing the different eco-friendly measures to increase scale of profitability and protection of environment through the different environment-friendly initiatives that is creating a wide range of green products and services such as online phone banking, mobile account, credit and debits cards, cash retailing withdrawal services and smart and small financing loans. These smart green initiatives are supporting the country's socio-economic development. Simultaneously, also promoting the concept and practices of environment sustainability which will ultimately lead the country and its nations towards longer sustainable development and prosperity in present and future times. Similarly, the standard green banking practices are carried out reduce the footprint of carbon emissions through different environment-friendly initiatives that is an opening of accounts and financial dealings are being performed to protect and preserve natural environment particularly through decreasing the activities that contribute to the level of environment pollution. At the same time, the green project investment presupposes the financial resources devoted to the projects that are planned to provide the environmental sustainability. Therefore, the proper usage of financial resources must be carried out towards projects that will produce environmental benefits. It is understood that green banking practices generate profitable operation as well as promote the environment sustainability practices.

Data Estimation Methods

This research study has used the quantitative research approach. Its main purpose is to explore the impact of green banking practices on both the environmental and related banking performance of the Pakistani banking industry. It uses cross-sectional survey design in order to collect the primary data on branch managers who serve in commercial banks in the Sindh province. This is an appropriate design as it gives an opportunity to test the relationship between variables and measure the hypotheses which are derived according to literature-review and statistical-methods. In addition, the province of Sindh, Pakistan, forms a sea of commercial activities. It is considered as the economic and financial hub of the entire economy of the country. It has the regional headquarters; branch offices and extensive networks of commercial and Islamic banks are some of the key banking operational centers in province Sindh. Owing to its contribution to the economy, urbanization and the presence of a high density of the banking infrastructure, the province is significant contribution to the financial system of the country. According to the existing statistics, there are 3,753 bank branches in Sindh and of these 3,622 branches (96.51) are operational. This means that there is a robust and solid banking presence of network. Hence the province Sindh is appropriate for this empirical research. Furthermore, all the operational bank branches in Sindh province are the units of the study. Considering one branch manager per branch, there are 3622 branch managers in the

active branches and the targeted sample is 360 branch managers according to Slovin's sampling selection formula. Due to time, financial and geographical challenges 300 branch managers have been selected for the collection of data through comprehensive questionnaire. The major banks which are working in Sindh that is Habib Bank Limited (HBL), United Bank Limited (UBL), MCB Bank Limited (MCB) Bank Al Falah (BAF), Bank Al Habib, Meezan Bank (MBL), Allied Bank Limited (ABL), Bank of Punjab (BOP), Standard Chartered Bank (SCB), Dubai Islamic Bank (DIB) and other financial institutions. Such extensive coverage guarantees the inclusion of the whole banking framework in Sindh. Moreover, the research has used the two-phase sampling method to make the research representative and achievable. Province Sindh is the geographical cluster. Its banking branches are spread over big metropolitan cities that is Karachi, Hyderabad, Sukkur and Larkana among others and other urban and semi urban centers. The first step is carried out that is cluster sampling technique to ensure the sample of respondents is representative of the different geographical locations. The second step is the proper selection of branch managers of the chosen clusters, who are available and interested to participate. This approach will ensure proper data collection of operational bank branches and a sensible feasibility. The primary data is used and collected through a structured questionnaire which has shared with the branch managers of the sampled banks in the Sindh region. There are some key variables are mentioned in the questionnaire that is green banking practices, operational efficiency, environment related performance, financial performance and profitable operations. All these questions are rated on a 5-point Likert scale comprising on strongly disagree, strongly agree. In addition, the unit of analysis is the branch manager of a bank since this individual is the one who directly implements the banking policies and makes operational and strategic decisions on a branch level. The collected data has been analyzed with the support Bootstrapping, Structural Equation Modeling and just a few other methods.

Data Results & Interpretation

Descriptive Statistics

Indicator	Minimum	Maximum	Mean	Variance	Skewness
Green Banking Practices1	1	5	2.983333333	0.899386845	**0.00966023**
Green Banking Practices2	1	5	2.996666667	0.899654404	**0.05401607**
Green Banking Practices3	1	5	2.963333333	0.864871795	**-0.0776079**
Green Banking Practices4	1	5	2.993333333	0.876209588	**0.03793022**
Green Banking Practices 5	1	5	3.016666667	0.899386845	**0.085078**
Green Banking Practices 6	1	5	3.013333333	0.869386845	**0.09802851**
Green Banking Practices7	1	5	2.97	0.872006689	**0.03503743**
Daily Operations1	1	5	2.96	0.934849498	**-0.0314327**
Daily Operations2	1	5	2.96	0.961605351	**-0.0267022**
Daily Operations3	1	5	2.96	0.901404682	**0.00929096**
Daily Operations4	1	5	3.006666667	0.936410256	**-0.147139**
Daily Operations5	1	5	2.933333333	0.905239688	**-0.0069497**
Daily Operations6	1	5	2.966666667	0.901895206	**-0.1455332**
Daily Operations7	1	5	2.963333333	0.864871795	**-0.1027243**
Green Investments1	1	5	2.993333333	0.856142698	**0.14076755**
Green Investments2	1	5	2.966666667	0.881828317	**0.09098603**
Green Investments3	1	5	2.98	0.842408027	**0.09194863**
Green Investments4	1	5	2.963333333	0.858182832	**0.04760436**
Green Investments5	1	5	3.013333333	0.809186176	**0.05699306**
Green Investments6	1	5	2.983333333	0.859253066	**0.13462438**
Green Investments7	1	5	2.956666667	0.824202899	**0.03177311**
Green Investments8	1	5	2.953333333	0.83393534	**0.14562835**
Environment Peformance1	1	5	3.016666667	0.778985507	**-0.0619348**
Environment Peformance2	1	5	3.036666667	0.831426979	**-0.1526006**
Environment Peformance3	1	5	3.023333333	0.818851728	**-0.1551385**
Environment Peformance4	1	5	3.013333333	0.889453735	**-0.1952224**
Environment Peformance5	1	5	2.996666667	0.779253066	**-0.1403279**
Environment Peformance6	1	5	3	0.909698997	**-0.0698489**
Profitability1	1	5	2.93	0.881371237	**0.01808377**
Profitability2	1	5	2.953333333	0.920891862	**0.00220605**
Profitability3	1	5	2.983333333	0.872630992	**-0.0658907**
Profitability4	1	5	2.96	0.894715719	**0.03231081**
Profitability5	1	5	2.943333333	0.842931996	**0.00826964**
Profitability6	**1**	**5**	**2.95**	**0.890468227**	**-0.0682171**

The descriptive statistics of the variables such as Green Banking Policy (GBP), Daily Operations (DO), Green Performance (GP), Environmental Performance (EP), and Profitability (P) give a general idea of the perceptions of the respondents on a 5-point Likert scale (strongly disagree to strongly agree). The analysis of each indicator has the minimum, maximum, mean, variance, and skewness values, which collectively describe the central tendency, dispersion, and distribution of the data. All indicators have mean values that are tightly concentrated around the neutral point, with a range of about 2.93 to 3.04. This implies that the respondents are "moderately agreeing" on all constructs and there is no high propensity to agree or disagree. The mean values in the case of Green Banking Policy (GBP) are 2.963 to 3.017, which means that the respondents have an "average perception" of the banks as being environmentally friendly, such as paperless banking and green lending practices. Similarly, Daily Operations (DO) shows mean values of 2.933 to 3.007, which shows a moderate perception of transparency and environmental reporting practices in banks. The same mean values of 2.953 to 3.013 are also shown by Green Performance (GP) and this indicates that there is a neutral to slightly positive perception of operational environmental performance. The scores of Environmental Performance (EP) are slightly higher with a mean of 2.997 to 3.037, indicating that the respondents are slightly agreeing that environmental outcomes are being achieved. The mean of profitability (P) is 2.93 to 2.983, which is rather neutral about the perceived impact of green banking on financial performance. The variance values of all indicators have a range of approximately 0.77 to 0.96, which means that there is a moderate level of dispersion in responses. This means that the respondents tend to have similar perceptions. Although, there is still a variation in the responses of individual respondents, but no extreme inconsistency is found. In terms of distribution, the skewness of all indicators are within the acceptable range of -1 to +1, which means that the data is approximately normally distributed. The skewness values are quite near to zero with slight positive or negative deviations. This means that the answers are fairly balanced and there is no great inclination to be more or less on the higher or lower ends of the scale.

Correlation Table

	GBP1	**GBP2**	**GBP3**	**GBP4**	**GBP5**	**GBP6**	**GBP7**	**DO1**	**DO2**	**DO3**	**DO4**	**DO5**
GBP1	1.0000	0.8848	0.8715	0.8702	0.8928	0.8739	0.8831	0.6777	0.6682	0.6456	0.6670	**0.6771**
GBP2	0.8848	1.0000	0.8757	0.8588	0.8924	0.8661	0.8835	0.6599	0.6543	0.6349	0.6413	**0.6668**
GBP3	0.8715	0.8757	1.0000	0.8718	0.8767	0.8684	0.8575	0.6567	0.6695	0.6498	0.6581	**0.6738**
GBP4	0.8702	0.8588	0.8718	1.0000	0.8666	0.8700	0.8721	0.6686	0.6883	0.6357	0.6499	**0.6567**
GBP5	0.8928	0.8924	0.8767	0.8666	1.0000	0.8810	0.8692	0.6646	0.6660	0.6471	0.6449	**0.6795**
GBP6	0.8739	0.8661	0.8684	0.8700	0.8810	1.0000	0.8609	0.6758	0.6809	0.6466	0.6597	**0.6758**
GBP7	0.8831	0.8835	0.8575	0.8721	0.8692	0.8609	1.0000	0.6802	0.6671	0.6399	0.6479	**0.6565**
DO1	0.6777	0.6599	0.6567	0.6686	0.6646	0.6758	0.6802	1.0000	0.8484	0.8216	0.8224	**0.8296**
DO2	0.6682	0.6543	0.6695	0.6883	0.6660	0.6809	0.6671	0.8484	1.0000	0.8281	0.8462	**0.8395**
DO3	0.6456	0.6349	0.6498	0.6357	0.6471	0.6466	0.6399	0.8216	0.8281	1.0000	0.8266	**0.8560**
DO4	0.6670	0.6413	0.6581	0.6499	0.6449	0.6597	0.6479	0.8224	0.8462	0.8266	1.0000	**0.8578**
DO5	0.6771	0.6668	0.6738	0.6567	0.6795	0.6758	0.6565	0.8296	0.8395	0.8560	0.8578	**1.0000**
DO6	0.6789	0.6756	0.6802	0.6694	0.6802	0.6804	0.6702	0.8326	0.8497	0.8331	0.8591	**0.8415**
DO7	0.6591	0.6293	0.6404	0.6298	0.6340	0.6331	0.6419	0.8315	0.8455	0.8203	0.8327	**0.8212**
GP1	0.6364	0.6821	0.6643	0.6525	0.6481	0.6475	0.6384	0.6128	0.6005	0.6088	0.5678	**0.5883**
GP2	0.6566	0.6945	0.6994	0.6770	0.6691	0.6804	0.6625	0.6395	0.6087	0.6175	0.5818	**0.6114**
GP3	0.6528	0.6722	0.6809	0.6616	0.6613	0.6530	0.6588	0.6285	0.6308	0.6362	0.5876	**0.6151**
GP4	0.6198	0.6507	0.6584	0.6322	0.6555	0.6278	0.6173	0.6033	0.5985	0.5991	0.5748	**0.5778**
GP5	**0.6550**	**0.6782**	**0.6762**	**0.6475**	**0.6662**	**0.6657**	**0.6415**	**0.6120**	**0.5845**	**0.6194**	**0.5839**	0.5950

The relationship among the indicators of Green Banking Policy (GBP), Daily Operations (DO), and Green Performance (GP) is tested using the correlation analysis. In general, the findings suggest that the measurement model is reliable and theoretically significant as they demonstrate that there is a strong internal consistency in each construct and moderate to strong positive correlations between constructs. The indicators of the Green Banking Policy (GBP1 to GBP7) show very strong positive correlations with each other with a range of about 0.85 to 0.89. This means that everything that gauges green banking policy is very consistent and all of them are one underlying concept. It shows that the respondents perceive different aspects of green banking policy such as environmental practices, paperless systems and sustainable financing as very interrelated aspects of the same construct. Similarly, the Daily Operation (DO) indicators (DO1 to DO5) are highly correlated with each other, ranging between 0.82 and 0.86. This implies that there is a high level of consistency among the items that are used to measure daily operational practices. It shows that the respondents perceive operational activities associated with environmental practices to be interrelated and to be a single construct. In terms of constructs relationship, the correlation between Green Banking Policy (GBP) and Daily Operation (DO) is moderate to strong with an approximate range of between 0.63 and 0.69. This implies that enhanced green banking policies have a positive relationship with better daily operational practices. Nevertheless, the correlation is not too high, which proves that both constructs are still different yet meaningfully related. The relationship between GBP and Green Performance (GP) is also moderate and the correlation values are generally between 0.61 and 0.70. This shows that green banking policies implementation positively affects environmental performance, but other factors can also affect performance results. Overall, all correlations are positive and significant, which implies that the positive changes in one construct are likely to be correlated with the positive changes in others. Notably, all the values of correlation are below the mark of 0.90, which proves that there is no problem of multicollinearity between the indicators. This helps in the convergent validity of constructs and the discriminant validity of constructs. Lastly, correlation analysis demonstrates the fact that the measurement model is statistically strong and conceptually valid. The high internal correlations imply reliability but the moderate inter-construct relationships imply that each construct is unique but interrelated. These findings give a good reason to continue with the analysis like Structural Equation Modeling (SEM) and Bootstrapping to analyze the structural relationships among the study variables.

Construct Operationalization

Construct	Type of outer model	Number of indicators	Predefined reliability
Green Banking Practices	Latent variable (Mode A consistent)	7	**1.0000**
Daily Operations	Latent variable (Mode A consistent)	7	**1.0000**
Green Investments	Latent variable (Mode A consistent)	8	**1.0000**
Environment Performance	Latent variable (Mode A consistent)	6	**1.0000**
Profitability	**Latent variable (Mode A consistent)**	**6**	**1.0000**

The construct operationalization table shows the measurement structure adopted in the study in the PLS-SEM framework. Mode A (consistent) models all model the indicators as latent variables, and is appropriate when the indicators are believed to be measures of the underlying construct. The research involves five constructs, namely, Green Banking Policy (GBP), Daily Operation (DO), Green Performance (GP), Environmental Performance (EP), and Profitability (PR). Every construct is assessed by a number of indicators, which cover the conceptual domain fully. Green Banking Policy (GBP) is evaluated with the help of 7 indicators, and Daily Operation (DO) is also evaluated with the help of 7 indicators, which reflect different aspects of banking operations. Green Performance (GP) is the most multidimensional construct since it is measured by the highest number of measurement items (8 indicators). Environmental Performance (EP) is operationalized with the help of 6 indicators, which are concerned with environmental outcomes and sustainability impacts. Likewise, Profitability (PR) is calculated with the help of 6 indicators, which are the results of financial performance. All the constructs will be predetermined to have a reliability of 1.0000, i.e. the reliability is internally measured in the PLS-SEM estimation process and is not externally specified. This validates that the model is based on empirical estimation of reliability by using measures like Cronbachs Alpha, Composite Reliability, and rho A in the measurement model evaluation phase. Overall, the construct operationalization demonstrates that all variables are regarded as reflective latent constructs with a consistent Mode A estimation, that is why the model has been further. The use of different indicators to every construct not only enhances the accuracy of measurements but also the construct validity and estimation of the structural model in the later stages of the analysis.

Construct Validity

Construct	Dijkstra-Henseler's RHO (PA)	Jöreskog's RHO (PC)	Cronbach's Alpha(A)
Green Banking Practices	0.9798	0.9798	**0.9798**
Daily Operations	0.9733	0.9731	**0.9731**
Green Investments	0.9782	0.9780	**0.9780**
Environment Performance	0.9675	0.9671	**0.9672**
Profitability	**0.9781**	**0.9780**	**0.9780**

Cronbachs Alpha (A), Dijkstra-Henseler's RHO and Joreskogs's RHO (PC) were used to determine the reliability and internal consistency of the constructs. The indicators are usually used in the analysis of PLS-SEM to determine the consistency of the measurement items to measure the latent constructs that the measurement items are supposed to measure. Based on the suggested rules in the literature, the acceptable level of these reliability indicators is at least **0.70 or more, which means that there is a satisfactory level of internal consistency between the indicators of each construct.

The results in the table show that all the constructs are above the recommended threshold, which means high reliability. In particular, the values of Cronbach Alpha, Dijkstra-Henseler's RHO, and Jöreskog's RHO were found to be equal to 0.9798, which means that Green Banking Practices has a very good internal consistency. Similarly, the reliability of the items used to measure daily operational practices were also found to be high (0.9733, 0.9731 and 0.9731) in the case of Daily Operations. Further, the construct Green Investments has the reliability values of 0.9782, 0.9780, and 0.9780, which shows that the indicators of environmentally responsible investment activities are strongly correlated and can effectively measure the construct. The construct Environmental Performance also has high internal consistency with values of 0.9675, 0.9671 and 0.9672 indicating that the items are effective to measure the environmental performance of the banks. On the same note, the high reliability values of 0.9781, 0.9780, and 0.9780 of the Profitability indicate that the indicators are always reliable in measuring the financial performance aspect of green banking practices. In general, the reliability of all constructs is much higher than the recommended level of reliability of 0.70, which means that the constructs have an excellent internal consistency reliability. These results prove that the measurement model is valid and that the indicators are sufficient to reflect their respective constructs. Thus, the constructs in this research can be deemed as being statistically reliable and can be further analyzed in terms of structural model, such as testing of hypothesis and path analysis in PLS-SEM framework.

Convergent Validity

Construct	Average variance extracted (AVE)
Green Banking Practices	**0.8737**
Daily Operations	**0.8379**
Green Investments	**0.8475**
Environment Performance	**0.8307**
Profitability	**0.8809**

The average variance extracted (AVE) is used to determine convergent validity of each construct. AVE is used to determine how much a construct accounts for the variance of its indicators in comparison to the variance of measurement error. According to the generally accepted guidelines and in the analysis of PLS-SEM, the value of AVE should be no less than 0.50 to guarantee that there is enough convergent validity. A higher value than this indicates that the construct is explaining more than half the variance in its indicators thus indicating that the indicators are good measures of the latent construct. The results of the table reveal that the value of all constructs is above and greater than the recommended value of **0.50, which proves the satisfactory convergent validity. In particular, the AVE value of the construct was found to be 0.8737 according to the report of the Green Banking Practices, which implies that a significant part of the variance in its indicators is explained by the construct. Similarly, the AVE of Daily Operations is 0.8379 that means that the items that measure daily operational practices are highly convergent to measure the construct. Additionally, the constructs like Green Investments had an AVE=0.8475 that means that the indicators of environmentally responsible investments are highly representative of the construct. The construct of Environmental Performance also shows a high convergent validity of 0.8307 AVE value indicating that the indicators are effective in measuring the environmental performance of the banks. Moreover, the highest AVE value of 0.8809 was reported by the construct of Profitability, which validates the constructs of profitability are strongly represented by the measurement items. Overall, the level of convergent validity of the constructs is high, as all the AVE values are much higher than the minimum acceptable level of 0.50. These results support the fact that the indicators used in the study are representative enough of their respective latent constructs and that the measurement model is very valid. In this way, further analysis of the structural models and hypothesis testing can be performed with the help of the constructs.

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

Construct	GBP	DO	GP	EP	PR
Green Banking Practices					
Daily Operations	0.7712				
Green Investments	0.7807	0.7313			
Environment Performance	0.7221	0.7058	0.7264		
Profitability	**0.7988**	**0.7740**	**0.8266**	**0.7051**	

Discriminant Validity is used to measure distinctness of different constructs through Heterotrait-Monotrait Ratio of Correlations (HTMT). HTMT is a commonly suggested approach in PLS-SEM analysis to assess the empirical uniqueness and dissimilarity of constructs with respect to each other. The HTMT value is supposed to be below 0.85 (or in other cases below 0.90) to indicate sufficient discriminant validity. When the values of HTMT are smaller than the threshold, it means that the constructs are not measuring the same thing and are not too correlated. The results in the table indicate that all the values of the HTMT are lower than the recommended value of 0.85, indicating that there is an acceptable discriminant validity between the constructs. Particularly, the HTMT value between the two constructs, namely, Green Banking Practices and Daily Operations is 0.7712, which suggests that the two constructs have a moderate yet acceptable relationship. Similarly, the value of HTMT between the two variables of Green Banking Practices and Green Investments is 0.7807 and the value of the relationship between the two variables Daily Operations and Green Investments is 0.7313, which is significantly less than the acceptable value. The value of the HTMT between the two constructs of Green Banking Practices and Environmental Performance is 0.7221, and between the two constructs of Daily Operations and Environmental Performance is 0.7058 which means that the constructs are different enough. The value of the HTMT between the two variables, the HTMT of Green Investments and Environmental Performance, is 0.7264, which also indicates the discriminant validity. In addition, the correlation coefficients between the variables of the study of Profitability are: HTMT 0.7988 with the Green Banking Practices, 0.7740 with the Daily Operations, 0.8266 with the Green Investments and 0.7051

with the Environmental Performance. All these values fall below the recommended value implying that profitability is empirically different to the other constructs. Overall, all of the HTMT values are below 0.85, the results indicate that the model has all constructs with established discriminant validity. This implies that the constructs are the various aspects of the research model and that there is no significant overlapping and similarity in the constructs. Thus, the measurement model shows sufficient discriminant validity.

Discriminant Validity: Fornell-Larcker Criterion

Construct	GBP	DO	GP	EP	PR
Green Banking Practices	0.8737				
Daily Operations	0.5948	0.8379			
Green Investments	0.6097	0.5355	0.8475		
Environment Performance	0.5212	0.4982	0.5278	0.8307	
Profitability	**0.6383**	**0.5994**	**0.6840**	**0.4976**	**0.8809**

Squared Correlations-AVE in Diagonal

The Fornell-Larcker criterion was also used to measure discriminant validity, and it is a widely applied technique in PLS-SEM to determine whether a construct is independent of other constructs in the model. Based on this criterion, the square root of the Average Variance Extracted (AVE) of each construct must be higher than the correlations of the construct with the rest of the constructs in the model. In case this condition is met, it means that a construct has more variance with its indicators compared to other constructs, which proves the discriminant validity. The findings in the table indicate that the diagonal items are the square root of the AVE, and the off-diagonal items are the correlations among the constructs. In the case of Green Banking Practices, the square root of AVE is 0.8737, which is greater than its correlations with Daily Operations (0.5948), Green Investments (0.6097), Environmental Performance (0.5212), and Profitability (0.6383). This means that the Green Banking Practices is distinctly different to the other constructs. Likewise, Daily Operations indicates a square root of AVE value of 0.8379, higher than its correlations with Green Banking Practices (0.5948), Green Investments (0.5355), Environmental Performance (0.4982), and Profitability (0.5994). This proves that the construct of Daily Operations is different enough to the rest of the variables in the model. The square root of AVE of construct Green Investments is 0.8475, higher than its correlations with Green Banking Practices (0.6097), Daily Operations (0.5355), Environmental Performance (0.5278), and Profitability (0.6840). This implies that the indicators of Green Investments have a higher variance within the construct as compared to other constructs. Similarly, the square root of AVE of Environmental Performance is 0.8307, which is greater than the square root of AVE of Green Banking Practices (0.5212), Daily Operations (0.4982), Green Investments (0.5278) and Profitability (0.4976). This affirms that Environmental Performance is empirically different with the rest of the constructs. Lastly, Profitability has the largest square root of AVE value of 0.8809, which is higher than its correlations with Green Banking Practices (0.6383), Daily Operations (0.5994), Green Investments (0.6840), and Environmental Performance (0.4976). This implies that the profitability construct has a high discriminant validity. Overall, the results satisfy the Fornell–Larcker criterion, as the square root of AVE for each construct is greater than its corresponding correlations with other constructs. Thus, the results prove that all constructs have a discriminant validity, meaning that each construct in the model measures a different concept and that they do not overlap significantly.

Structural Model

Construct	Coefficient of Determination (R^2)	Adjusted R^2
Profitability	**0.7678**	**0.7647**

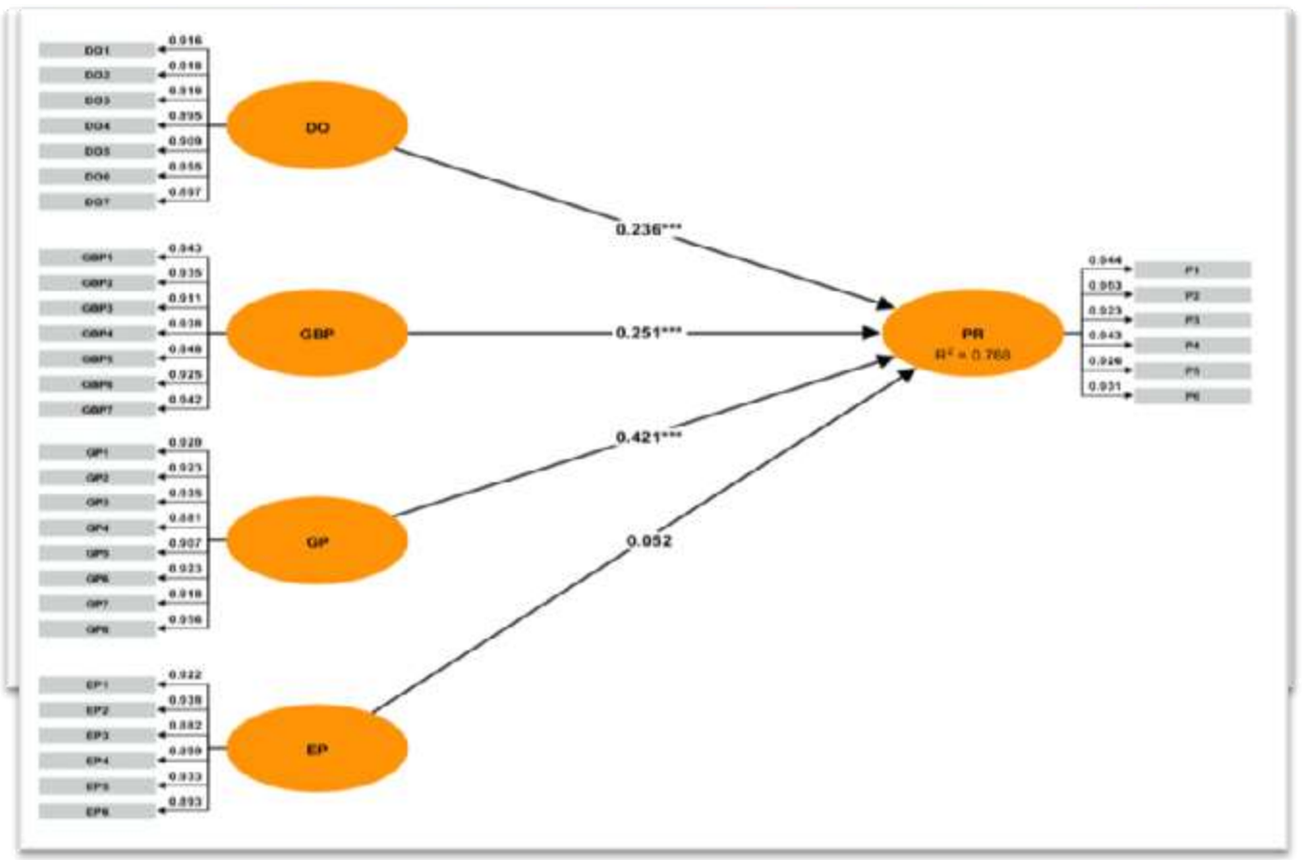
The results of the structural model show that the predictors have a high explanatory power of Profitability (PR). The coefficient of determination (R 2 = 0.7678) indicates that about 76.78 percent of the change in profitability is attributed to the independent variables in the model. This means that the predictive power is high, which means that the model explains the majority of significant drivers of profitability in the studied scenario. The fact that the adjusted R 2 value is 0.7647 also testifies to the strength of the model. Since the adjusted R 2 is employed to explain the number of predictors and penalize irrelevant variables, its proximity to the R 2 value indicates that the model is well-specified and the model is not overfitting. The narrow difference between the two values justifies the fact that the constructs used are adding value and effective in explaining profitability. All in all, these findings prove that the structural model is very explanatory, and the independent variables collectively contribute greatly towards profitability.

Path Coefficients

Independent Variables		Dependent Variable Profitability (Profitability)
Green Banking Practices		**0.2506**
Daily Operations		**0.2365**
Green Investments		**0.4206**
Environment Performance		**0.0521**

The path coefficient results clarify the connection between the independent variables, Green Banking Practices (GBP), Daily Operations (DO), Green Investments (GP), and Environmental Performance (EP) and the dependent variable Profitability (PR). The results indicate that each of the variables is positively correlated with profitability, i.e. the better each of the factors, the higher the bank profitability. The most influential in terms of profitability among them is Green Investments (GP) with a coefficient of 0.4206. This implies that the most significant determinant of profitability in the model is investment in environmentally friendly and green projects. The positive and moderate impact on profitability is also noted in Green Banking Practices (GBP) with a coefficient of 0.2506. This implies that green banking policies like paperless banking and environmentally

friendly lending are beneficial in enhancing financial performance, but not as much as green investments. The impact of Daily Operations (DO) on profitability is slightly less, but significant with a coefficient of 0.2365. This means that operational efficiency is important as it leads to profitability through efficiency in the normal running of the banking business. Environmental Performance (EP) has the least positive influence on profitability of 0.0521. This implies that although environmental performance does have a role in profitability, it has a low impact than the other variables in the model. All in all, the findings suggest that Green Investments are the most influential factor of profitability, then there is Green Banking Practices and Daily Operations, and the influence of Environmental Performance is rather small.



Estimated SEM Model

The structural model shows that Green Banking Practices (GBP), Daily Operations (DO), and Green Practices (GP) have a significant positive impact on Profitability (PR), as all three relationships are statistically significant. Among these, Green Practices (GP) has the strongest effect (β = 0.421), followed by GBP (β = 0.251) and DO (β = 0.236), indicating that improvements in these areas contribute meaningfully to increase banking profitability. In opposite, Environmental Performance (EP) shows weak and statistically insignificant effect (β = 0.052) on profitability. It is indicating that it does not impact financial outcomes in this model. Therefore, the hypothesis related to EP is rejected, while all other hypotheses are accepted. Overall, the model demonstrates strong explanatory power with an R^2 value of 0.768, meaning that 76.8% of the variation in profitability is explained by the four predictors (DO, GBP, GP, and EP). It is proved that green banking-related practices play an important role in improving the profitability of commercial banks while environmental performance alone does not directly translate into financial gains in this context.

Calculated SEM Bootstrapping

The relationship between Green Banking Practices, Daily Operations, Green Investments and Environmental Performance and profitability of commercial banks have been studied by the direct effects bootstrap analysis. The results provide empirical evidence of the significance, power and orientation of these relationships. The findings show that the positive and statistically significant effect of Green Banking Practices on profitability is positive (= 0.2506, t = 4.2007, p < 0.001). This means that the green banking policies, paperless banking and green banking programs can be significant in enhancing the financial performance of the banks. The significance of the relationship justifies why green banking practices is one of the strategic considerations in improving profitability. Similarly, the beneficial and significant effect on profitability is observed with Daily Operations (0.2365, t = 4.3692, p < 0.001). This means that operational performance, improved internal performance, and digital banking systems are of paramount importance in improving financial performance. Its daily running is effective, this reduces the operation cost and enhances productivity which has a positive effect on profitability. The Green Investments are also the most influential and most significant in profitability (0.4206, t = 7.5695, p < 0.001). This indicates that the banks which are engaged in the environmentally friendly investments such as renewable energy funding and green project funding are more profitable. The magnitude of this coefficient suggests that the green investments are the most important variable in the set of variables under investigation, both in financial and environmental benefits. On the other hand, there is a positive but statistically insignificant relationship between Environmental Performance and profitability (= 0.0521, t = 0.9685, p = 0.333). The null hypothesis cannot be rejected because the p-value is more than the level of significance of 0.05. This means that environmental performance is not directly related to profitability in the present study. It may also indirectly affect financial performance through other mediating variables or long-term strategic effects.

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