



ADOPTION OF GREEN BANKING: AN ANALYSIS IN SOME SELECTED AREAS OF BANGLADESH

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ABSTRACT

Green banking is the new way of conducting banking business through encouraging eco-friendly practices and lowering the carbon footprint of banking operations. The present study was conducted to analyze the green banking activities and reasons for the adoption of green banking, examine the factors contributing to the adoption of green banking, assess the relationship between green banking and the factors affecting the adoption of green banking, and find out the problems faced by bank officials in adopting green banking. A total of six banks and 60 bank employees were selected randomly from Mymensingh and Sylhet districts in Bangladesh. Data were analyzed through the Likert scale and the Pearson Chi-square test. A multinomial logistic regression model and the Garrett ranking method were also used. The major findings showed that private banks were more concerned about green activities than public banks, and the most important reason for the adoption of green banking was that banks wanted to convert their activities from traditional to modern. Environmental benefits, stakeholder pressure, policy guidelines, economic components, and loan demand were significantly influenced by adopting green banking. This study found that the lack of training for bank officials and the inadequate knowledge of customers about green activities were two of the biggest problems for the adoption of green banking. For the improvement of green banking services, a training facility for bank officials needs to be established.

Keywords: Green banking, Adoption, Problems, Bank officials, Bangladesh.

INTRODUCTION

Green banking means promoting environment-friendly practices and reducing the carbon footprint of banking activities. The phrase "green banking" refers to procedures and policies that make banks sustainable in terms of the economy, environment, and society (Rajesh and Dileep, 2014). Green banking has also been a significant issue in recent times. While the banking industry is undergoing computerization, networking and the offering of online banking are naturally gaining momentum in this sector (Islam, 2010), and green banking promotes environmentally friendly activities and sustainable economic growth (Phuong, 2020). Green finance is all about going above and beyond to improve the planet while causing minimal harm. It is referred to as ethical banking and takes into account all social and environmental factors. The main goal of green banking is to ensure that an administration uses its resources in a way that benefits both society and the environment.

Green banking can reduce the adverse effects of climate change by reducing carbon emissions through paperless banking. Less paper work means less deforestation, and it uses solar energy for proper resource utilization. People are more conversant with global warming and its adverse consequences for human life. So, it is high time to bring changes to the policies in order to protect the environment in a sustainable manner, as this is the need of the hour for survival. Green banking practices of Bangladesh's commercial banks, the reasons why this policy was adopted, and how those policies contrasted with those of the commercial banks and the policies that should be followed in regard to green banking and related laws focused by Mozib Lalon (2015). Besides this, credit risk, legal risk, and reputation risk can all be reduced with the help of green banking and suggestions for green banking practices, including the sale of carbon credits, green financial products, green mortgages, paperless banking, energy awareness, mass transit, green building, and social responsibility services for the community (Dharwal and Agarwal, 2013). Hoshen *et al.* (2017) categorized the banking and non-banking sectors in Bangladesh to establish how green money was distributed to the various green projects and obstacles faced in distributing the money. The refinancing scheme for green products by the Bangladesh Bank was also trending in this analysis. This study found that private commercial banks (PCBs) give more

money to green initiatives and those they are increasingly likely to reinvest in them. (Ullah, 2013) analyzed a comparative analysis of several bank kinds, including state-owned commercial banks (SCBs), state-owned specialized development banks (SDBs), public commercial banks (PCBs), and foreign commercial banks (FCBs), while addressing the scenario of green banking practices.

The purpose of the study was to determine whether the banks have implemented the principles and faces challenges of green banking. Lower interest rate to customer for installing solar energy system, bio-gas plant, energy saving equipment, use of green and recycled material in Bangladesh provides by green banking (Masukujjaman and Aktar, 2014). In order to safeguard the environment, Green Banking was formally launched in 2003. Then the Equator Principles (EPs) were introduced, and several of the biggest institutions in the world, including Citigroup Inc., The Royal Bank of Scotland, and Westpac Banking Corporation, first adopted them. To create a green bank owned by the US government, Congressman Chris Van Hollen of the USA submitted the Green Bank Act in March 2009 (Mozib Lalon, 2015). In 2011, Bangladesh Bank implemented a green banking policy. All the commercial banks have already adopted a green banking policy in their internal practices and also formed a green banking unit to look after the green banking activities of the respective banks (Islam, 2013). Bangladesh's banks and non-bank financial institutions contribute to the country's broader economy by using green financing, and banks and other financial institutions (FLs) get opportunities when it comes to green financing (Ashiq and Shahir, 2019).

In US dollars, the country's per capita income more than tripled between 2000 and 2017, while in terms of purchasing power parity, it more than doubled. Its gross domestic product (GDP) growth rate of 7.86% in 2018 was noteworthy (Khairunnessa *et al.*, 2021). However, this economic expansion has accelerated industrialization and the start of numerous megaprojects, which ultimately come at the cost of environmental deterioration. Between 2000 and 2016, Bangladesh's CO₂ emissions per capita more than quadrupled from 0.2 to 0.46 metric tons of CO₂, but they are still relatively low (less than one tenth) of the global average of 4.8 t CO₂/capita (Khairunnessa *et al.*, 2021).

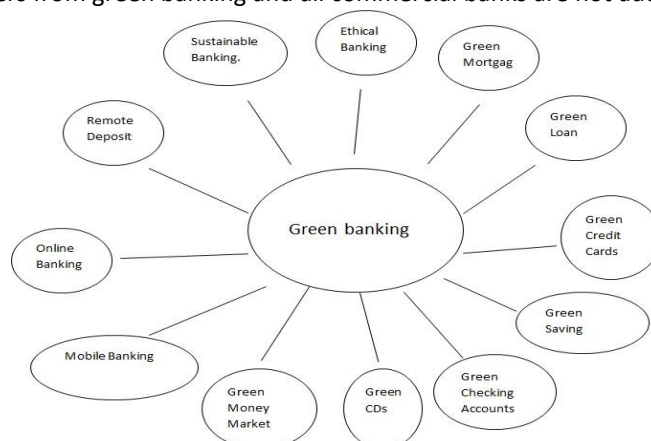
Green banking products

Customers that care about the environment want to know what their carbon footprint is so they may take appropriate action and impact the world. As the custodians of spending data, banks are in a prime position to provide carbon footprint estimation and then offer solutions in the form of green banking products. Many times, becoming green is expensive for the consumer. Be it electric cars, sustainable clothing, or another green alternative, eco-friendly products tend to come with an added cost. However, banks can offer their customers green banking products that don't cost the earth. In fact, banks can go further than that and provide green banking products that incentivise consumers to make green choices. To illustrate how, let's take a look at a few examples of green retail banking products: green car loans, green savings and bonds, green mortgages, green home modernization loans, etc. According to Bangladesh Bank (2021), nearly three-quarters (68%) of consumers are interested in green financial products. Because of this, 89% of bankers predict that this will be a sector of retail banking that grows rapidly in the future. The green banking items are in Figure 1.

Figure 1: Product of Green Banking

Source: Bangladesh Bank, 2021

As traditional banking differs from green banking and all commercial banks are not adopting green banking the





same way, we are assuming that answering some research questions will foster the adoption of green banking. The research questions in this study were: (i) What are the green banking activities run by the banks, and (ii) What are the reasons for the adoption of green banking? (ii) What are the factors contributing to the adoption of green banking? (iii) What is the relationship between green banking and the factors affecting the adoption of green banking? (iv) What are the problems faced by bank officials in adopting green banking? On the premise of the research questions, this research was focused on analyzing the green banking activities and reasons for the adoption of green banking; examining the factors contributing to the adoption of green banking; assessing the relationship between green banking and the factors affecting the adoption of green banking; and finding out the problems faced by bank officials in adopting green banking.

MATERIALS AND METHODS

A total of six banks named Sonali Bank Ltd., Rupali Bank Ltd., Pubali Bank Ltd., Dutch Bangla Bank Ltd., International Finance and Commerce Bank Ltd., and Islami Bank Bangladesh Ltd. were selected for this study, and 60 bank employees were chosen at random from the chosen banks in the districts of Sylhet and Mymensingh. To ensure reliability, data were collected from the sample respondent by the survey method. The time period of data collection was March to May 2022. The researcher herself conducted one-on-one interviews with each respondent when they weren't otherwise engaged.

The most frequently used summated scales in the study of social attitudes follow the pattern of the Likert scale. The scale is named after its inventor, psychologist Renesis Likert (Likert, 1932). In a Likert-type scale, the respondent is asked to respond to each of the statements in terms of several degrees, usually five degrees (but at times 3 or 7 may also be used), of agreement or disagreement. Using a Likert scale allows the respondents to indicate their attitudes by checking how strongly they agree or disagree with the constructed statements (Zikmund, 2003).

Garret ranking technique was used to find out the most familiar green banking practices among customers and customers views or perceptions to green banking practices through ranking. The customers were asked to rank the green banking practices (Koiry *et al.*, 2017).

Pearson's chi-square (X^2) tests, often referred to simply as chi-square tests, are among the most common non-parametric tests. The purpose of a chi-square test is to examine categorical data. This indicates that the information has been tallied and categorized. Continuous or parametric data won't function with it. A chi-square test can test whether observed frequencies are significantly different from the frequencies expected (Arumugam and Chirute, 2018).

Regression analysis examines how one variable, called the dependent variable, is reliant on one or more explanatory variables, called the explanatory variables, in order to estimate or predicting the (population) mean or average value of the former in terms of the known or fixed (in repeated sampling) values of the latter (Gujarati, 2013). Logistic regression is an extension of linear regression used to predict the dichotomous dependent variables. Multinomial logistic regression is the regression analysis to be conducted when the dependent variable is nominal with more than two levels. Multinomial logistic regression is used to explain the relationship between one nominal dependent variable and one or more independent variables.

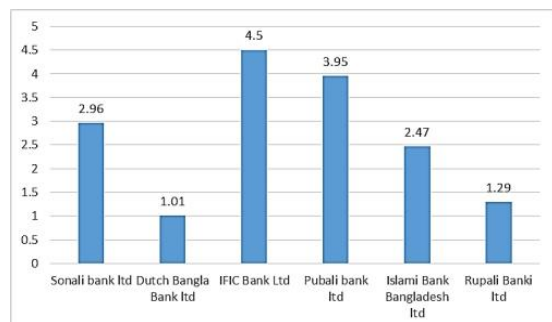
RESULTS AND DISCUSSION

Green banking activities performed by banks

Green banking is characterized as encouraging eco-friendly behaviors and lowering the carbon footprint resulting from banking activities. Therefore, green banking requires a two-pronged strategy. First and foremost, green banking concentrates on the green transformation of the banks' internal processes.

Figure 2 indicates that IFIC Bank Ltd. was the highest financing company for green projects, and Pubali Bank Ltd. was the second one. Dutch Bank Ltd. had less concern for green finance.

Figure 2: Financing in green projects (in crore)



Source: Field Survey, 2022

Figure 3: Number of organic projects financed by the bank

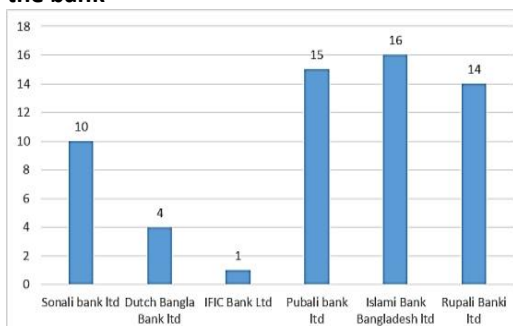
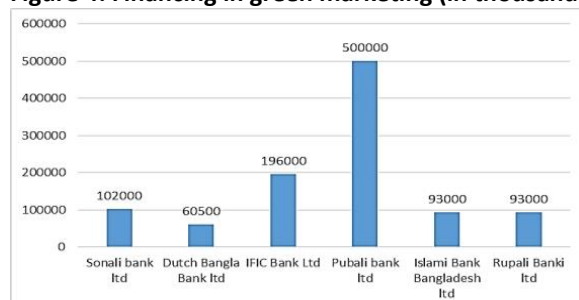


Figure 3 indicates that Islami Bank Bangladesh Ltd. was in the first position for organic projects, and IFIC Bank stood in the lowest position. Pubali Bank Ltd. and Rupali Bank Ltd. attained second and third positions for the taking of green organic projects like organic farming, vermicompost production, biogas plants, etc.

Figure 4 shows the commercial banks in the study area that financed green marketing the most. The promotion of ecologically friendly goods, services, and projects is known as "green marketing." Here, Pubali Bank Ltd. attained the first position for green marketing, which indicates they were more concerned about their green initiatives. IFIC Bank Ltd. was the second-largest financing bank for green marketing, and Dutch Bank Ltd. was the lowest-concerning bank in green marketing.

Figure 4: Financing in green marketing (in thousand)



Source: Field Survey, 2022

Figure 5: Number of mobile banking users

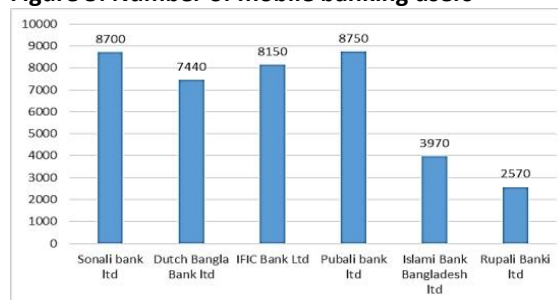


Figure 5 indicates that Pubali Bank Ltd. had the highest number of mobile banking user customers, and Sonali Bank Ltd. was in the second position. Rupali Bank Ltd. had the fewest mobile banking users.

An ATM card is a bank card that is used to access an ATM. Almost everyone who has a checking account also has a debit or credit card, which can be used at an ATM. From figure 6, it can be clear that Pubali Bank Ltd. and Dutch Bangla Bank Ltd. had the highest ATM card users in the study area. IFIC Bank Ltd. was also in a good position, but Rupali Bank Ltd. had the lower ATM card usage. From here, it can be realized that private commercial banks allocated the funds for green finance rather than state-owned commercial banks. We also realized that the utilization of allocation funds in private commercial banks is higher than in other state-owned commercial banks.

Figure 6: Number of ATM (debit/credit) card users

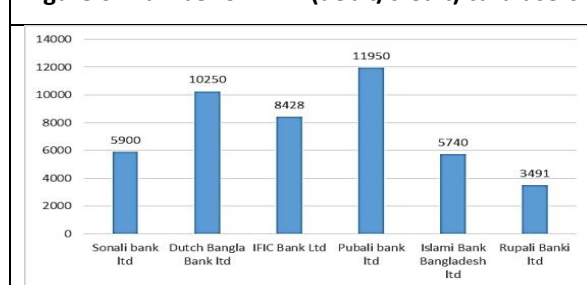
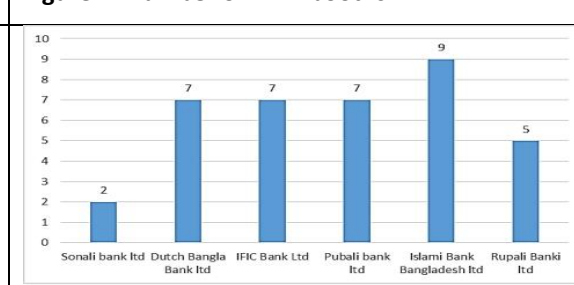


Figure 7: Number of ATM booths

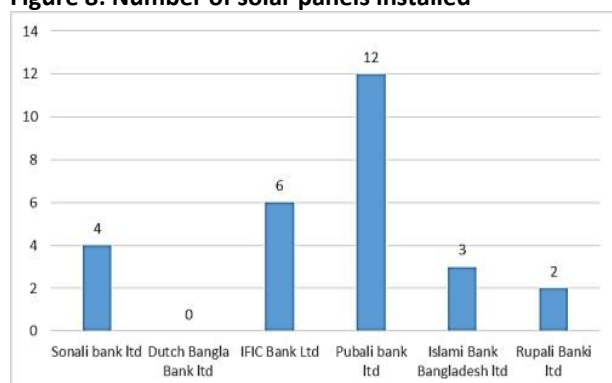


Source: Field Survey, 2022

Figure 7 shows that Islami Bank Bangladesh Ltd. had a greater number of ATM booths than other banks in the study area. That means Islami Bank Bangladesh Ltd. had a great concern for their customer services and green initiatives. Pubali Bank Ltd., IFIC Bank Ltd., and Dutch Bank Ltd. stood in the same position as Sonali Bank Ltd., which was very poor for their lower ATM booth services.

Figure 8 shows that Pubali Bank Ltd. was the highest solar panel user bank. But the other banks were not concerned about this, and this study didn't find any solar panels from Dutch Bank Ltd. in the study area. All the banks should be concerned about the use of solar panels because no greenhouse gas emissions are released into the atmosphere when we use them to create electricity, and they are environmentally friendly.

Figure 8: Number of solar panels installed



Source: Field Survey, 2022

Reasons for the adoption of green banking according to bankers' perceptions

The lower mean value indicates the highest satisfaction of the respondent, and the higher mean value indicates the lower satisfaction of the respondent. From Table 1, statement 5 had a lower mean of 1.52 in the table above, making it the most significant and satisfying statement in terms of mean. This suggests that, in comparison to the other claims, the statement was highly noteworthy. Helping to achieve scores in the CAMELS rating was the second important reason recommended by the bank employee for the adoption of green banking. The statement 10, which is high demand for green loans, had a higher mean of 3.52, which indicates the lower satisfaction of the respondent. Thus, it was found that most of the respondents were positive about adopting green banking.

Table 1: Reasons for adoption of green banking according to bankers' perceptions

Sl.No	Statements	N	Sum	Mean	Std. Deviation	Rank
1.	It helps to achieve scores in CAMELS. Rating	60	105	1.75	0.508404	2
2.	Reduce CO ₂ footprints by customers	60	147	2.45	0.622325	8
3.	Consciousness about the environment	60	122	2.03	0.449733	5
4.	Eliminate the errors and hazards of handling paper documents	60	128	2.13	0.535729	6
5.	Converts banks from traditional to modern banking	60	91	1.52	0.650728	1
6.	Green banking activities are easy to Manage	60	170	2.83	1.060327	9
7.	It helps establish environmentally friendly projects.	60	107	1.78	0.666172	3
8.	Paperless banking to reduce transaction cost	60	142	2.37	0.78041	7
9.	Ensure efficient use of resources.	60	113	1.88	0.666172	4
10.	High demand for green loans	60	211	3.52	0.812856	10

Source: Field Survey, 2022

The most important attributes of green banking

From Table 2, the lower mean value indicates the highest satisfaction of the respondent, and the higher mean value indicates the lower satisfaction of the respondent. Here, statement 1 has a lower mean of 1.32, making it the most significant and satisfying statement in terms of mean. Social welfare was the second-most important attribute recommended by the bank employee for the adoption of green banking. The statement 7,

which is convenience, had a higher mean of 2.78, which indicates the lower satisfaction of the respondent. They said the maintenance of online activities was so difficult.

Table 2: Most Important Attributes of Green Banking

Sl. No	Attributes	N	Sum	Mean	Std. Deviation	Rank
1.	Environment friendly	60	79	1.32	0.46910	1
2.	Time saving	60	125	2.08	0.61868	4
3.	Profitable	60	141	2.35	0.60576	6
4.	Improved bank image	60	94	1.57	0.62073	3
5.	Social welfare	60	96	1.60	0.69379	2
6.	Updation	60	129	2.15	0.57710	5
7.	Convenience	60	167	2.78	0.88474	8
8.	Cost effective	60	164	2.73	0.93639	7

Source: Field Survey, 2022

Environmental benefits of adopting green banking

The mean in Table 3 as in the exhibit represents the level of statement satisfaction; therefore, the analysis shows that the statement green banking mitigates a very small amount of environmental pollution with a value of 1.62, which gives high satisfaction to the majority of the respondents ranking in the first position, and banks contribute to environmental degradation by financing industries, which was given the lowest satisfaction from the respondents. Green banking brings an eco-friendly environment, which was the second important factor in adopting green banking.

Table 3: Environmental Benefits of Adopting Green Banking

SL No	Question	N	Sum	Mean	Std. Deviation	Rank
1.	Green banking brings eco-friendly Environment	60	107	1.78	.524	2
2.	The use of waste minimization and pollution prevention is an initiative of green banking.	60	120	2.00	.368	6
3.	Green banking protects the environment and gives benefits to banks and customers through online services.	60	109	1.82	.701	3
4.	Ending the degradation of the environment and saving the environment is the initiative of green banking.	60	112	1.87	.468	5
5.	Green banking reduces the carbon footprint.	60	110	1.83	.693	4
6.	Banks contribute to environmental degradation by financing industries.	60	135	2.25	.571	8
7.	Green banking mitigates a very small amount of environmental pollution.	60	97	1.62	.640	1
8.	Banks are encouraging projects that show their concern for the environment in the form of sustainable development.	60	121	2.02	.291	7

Source: Field Survey, 2022

Stakeholder pressure to adopt green banking

From Table 4, the mean of 1.72 represents that the respondent's level of satisfaction demonstrates the high level of satisfaction with which the majority of respondents ranked in the top spot. The mean of 2.60 indicates the lower level of satisfaction of the respondent, and the statement was that bankers have the power to impose restrictions on the establishment of any industries or projects without using green banking practices. The majority of survey participants are aware of stakeholder pressure, particularly on the contribution of bankers to Bangladesh's adoption of green banking to improve the environment.

Table 4: Stakeholder pressure to adopt green banking

Sl. No	Question	N	Sum	Mean	Std. Deviation	Rank
1.	Bankers claim that green banking attracts international customers to the bank.	60	148	2.47	.892	6
2.	Bankers say electronic banking, mobile banking, or the use of ATMs are methods of green banking.	60	103	1.72	.524	1
3.	Bankers feel commercial banks may provide more loans at lower rates to eco-friendly industries.	60	134	2.23	.686	3
4.	Bankers provide low interest rates to help spread the concept of green banking.	60	152	2.53	.566	7
5.	Bankers have the power to impose restrictions on the establishment of any industry or project without using green banking practices.	60	156	2.60	.558	8
6.	Enterprises are building up techniques that will assist them in reporting issues faced by the environment.	60	143	2.38	.555	5
7.	The organization reacts to environmental pressures from its main stakeholders by decreasing toxic emissions.	60	137	2.28	.446	4
8.	Bankers are aware of spreading the green banking practice in other industries or sectors.	60	124	2.07	.607	2

Source: Field Survey, 2022

Policy guidelines to adopt green banking

Table 5 shows the mean value for eight of the variables for the policy guideline; here the variables lie between 'strongly agree' and neutral'. This also means that banks were mostly dependent on their policy guidelines to adopt green banking. Here, the mean was ranked in ascending order, and the mean indicates the satisfaction level of the respondent. The statement 4 has a mean of 1.80 in the table above, making it the most significant and satisfying statement in terms of mean. The statement 7 has the highest mean value, which indicates the lower satisfaction of the majority of the respondents. The second one was also an important factor in adopting green banking because policy formulation could help the banks implement different strategies. To sum up, according to the majority of survey respondents, one of the key factors driving the adoption of green banking in Bangladesh's public and private banks is legislative guidance.

Table 5: Policy guidelines to adopt green banking

Sl.No	Questions	N	Sum	Mean	Std. Deviation	Rank
1	Green banking policy aims to encourage banks to embrace e-commerce as a facilitator of green banking.	60	114	1.90	.227	4
2	In Bangladesh, ecological regulations are the motive for a few organizations to contract out.	60	118	1.97	.372	6
3	Banks are required to figure out and embrace the policy of green banking.	60	113	1.88	.206	3
4	Banks should adopt green banking to secure corruption.	60	108	1.80	.197	1
5	Policy formulation is vital for banks. because the strategy matches green banking activities.	60	112	1.87	.253	2
6	Banking policy can support the banking industry by promoting green banking practices.	60	116	1.93	.640	5
7	Bankers are aware of spreading the green banking practice in other industries or sectors.	60	146	2.43	.250	8
8	Banking policy can be supportive for the banking sector in overcoming institutional obstacles.	60	143	2.38	.749	7

Source: Field Survey, 2022

Economic factors to adopt green banking

Table 6 shows the mean value for seven of the variables for the economic factor; here the variables lie between 'Strongly Agree' and 'Neutral'. This means that banks were mostly positive and agreed to adopt green banking. Statement 1 has a lower mean of 1.83, making it the most significant and satisfying statement in terms of mean. This suggests that, in comparison to the other claims, the statement is highly noteworthy. The statement 6, which states that individuals can deposit cash all over the place and pull back from each ATM corner, had a higher mean of 2.52, which indicates the lower satisfaction of the respondent. Thus, it is assumed that economic factors have an impact on the adoption of green banking in Bangladesh's public and private banks, with most respondents agreeing that green banking has a beneficial impact.

Table 6: Economic factors to adopt green banking

Sl.No.	Question	N	Sum	Mean	Std. Deviation	Rank
1.	Economic factors influence business on great choices and controlling an association.	60	110	1.83	.345	1
2.	The business financial environment defines the achievement or disappointment of a business.	60	122	2.03	.270	3
3.	Green financing is the allocation of reserves to environmentally friendly ventures.	60	129	2.15	.321	5
4.	The green banking effect appears in the economy to benefit financial organizations.	60	127	2.11	.151	4
5.	Government financing at the cost of capital requires private sector financing to be profitable.	60	145	2.42	.349	6
6.	Individuals can deposit cash all over the place and pull back from each ATM corner.	60	151	2.52	.729	7
7.	Online banking decreases the use of paper and human resources	60	112	1.87	.524	2

Source: Field Survey, 2022

Loan demand to adopt green banking

Table 7 shows the mean value for seven of the variables of loan demand, which means the variables lie between 'agree' and 'neutral'. Statement 1 has a lower mean of 2.05, which means that loan demand can motivate industries and projects implementing green banking activities. It was the most significant and satisfying statement in terms of mean. This suggests that, in comparison to the other claims, the statement is highly noteworthy. The statement 4, which was a loan demand, is one of the most crucial factors influencing the adoption of green banking. The higher mean of 2.55 indicates lower satisfaction for the respondent. Thus, it is assumed that loan demand has an impact on the adoption of green banking in Bangladesh's public and private banks.

Table 7: Loan demand to adopt green banking

SL No	Question	N	Sum	Mean	Std. Deviation	Rank
1.	Loan demand can motivate industries and projects implementing green banking activities.	60	123	2.05	.218	1
2.	Loan demand is a loan with a minimal amount of restriction with respect to the lender.	60	126	2.10	.092	3
3.	Discount of interest rate is a policy of the government in providing support for loan costs.	60	146	2.43	.453	5
4.	Loan demand is one of the most crucial factors influencing the adoption of green banking.	60	153	2.55	.524	7
5.	Green banking attempts to ensure that loans are provided at a lower rate.	60	151	2.51	.863	6

6.	Bank loaning assumes impacting levels of customer spending, investment, and economic development.	60	124	2.07	.301	2
7.	The government should provide subsidies on loan costs in specific sectors to support the implementation of green banking.	60	139	2.32	.220	4

Source: Field survey, 2022

Descriptive statistics of the factors

Table 8 indicates the overall impact of the factors on the adoption of green banking in Bangladesh. Here, the mean indicates the highest and lowest satisfactory factors for implementing green banking. Environmental benefit was the first satisfactory factor to adopt green banking, with a mean of 1.8810, and loan demand was the lowest satisfactory factor to implement green banking. According to bankers' perceptions, the environment and people could benefit from green banking adoption, and the loan demand for environmental projects was very low. The second most important factor was policy guidelines, which were helpful in implementing different strategies in banks for the adoption of green banking.

Table 8: Descriptive statistics of the factors

Factors	N	Minimum	Maximum	Mean	Std. Deviation	Rank
Environmental benefit	60	1.14	2.43	1.8810	.32338	1
Stakeholder pressure	60	1.75	3.13	2.2875	.35378	4
Policy guideline	60	1.25	3.00	2.0208	.35814	2
Economic factor	60	1.29	3.00	2.1333	.40566	3
Loan demand	60	1.71	3.14	2.2905	.38474	5
Valid N (list-wise)	60					

Source: Author's estimation, 2022

Table 9 shows the normality test for the distribution of the factors. As the value was less than 0.05, the factors were normally distributed, and here two hypotheses were assumed:

H0: normal distribution

H1: Do not follow the normal distribution.

As the Shapiro-Wilk test value is less than 0.05, the data were not normally distributed. From Table 9, the factors are not significant, and the value is greater than 0.05. That's why the entire factor is not normally distributed. And we again transformed all the factors in log form to understand if all the factors were normally distributed.

Table 9: Test of Normality

Kolmogorov-Smirnov ^a				Shapiro-Wilk		
Significance	Statistic	Df	Sig.	Statistic	Df	Sig.
Environment	.400	60	.000	.617	60	.000
Stakeholder	.421	60	.000	.653	60	.000
Economic	.394	60	.000	.685	60	.000
Policy	.370	60	.000	.715	60	.000
Loan	.379	60	.000	.705	60	.000

Source: Author's estimation, 2022

Total factor effect on green banking

Table 10 shows the total factor effect on green banking, and the mean of 2.1226 indicates that most of the respondents to this study were positive and agreed with the adoption of green banking. From the study, it has been concluded that green banking improves the environment and is more environmentally friendly; banks are continuing to encourage other organizations to join the project. Because green banking is still relatively new and most of the public is unaware of it.

Table 10: Total factor effect on green banking

N	Valid	60
	Missing	0
Mean		2.1226
Variance		.094
Sum		127.36

Source: Author's estimation, 2022

Factor effect on green banking

The likelihood ratio test proves that independent variables like economic factors and policy guidelines are significant, which proves that these predictors contribute significantly to the final model. From Table 11, the chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. An effect is removed from the final model to create the reduced model. The idea behind the null hypothesis is that the effect's parameters are all zero. As the p value is less than 0.05, the model is good, and the null hypothesis can be rejected. So we found a relationship between green banking and stakeholder, policy, and loan factors. On the other side, there is no relationship between environmental benefits and green banking.

Table 11: Results of factor effects on green banking

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	99.489	6.345	5	.274
Environment	100.634	7.490	5	.187
Stakeholder	110.022	16.878	5	.005
Economic	102.145	9.001	5	.037
Policy	104.459	11.315	5	.045
Loan	114.002	20.858	5	.001

Source: Author's estimation, 2022

From Table 12, the values are significant, and the negative coefficient for the banks (value of -4.462, -5.361, -5.361, and -1.428) shows that for every one unit increase in factors effects on adoption of green banking, there is a predicted decrease of 4.462, 5.361, 5.361, and 1.428 in the log odds of being on a higher level on green banking adoption. The positive coefficient for the Dutch Bangla Bank Ltd. value of 2.788 indicates that there is an increased probability of factors having an effect on the adoption of green banking. For IFIC bank stakeholder pressure, the economic and policy guideline factors (values of 80.238, 4.613, and 5.488) have a great effect on green banking adoption. Environment, stakeholder, and economic factors (values of 6.119, 41.309, and 10.922) have a great effect on green banking adoption for Pubali Bank Ltd. Environment, stakeholder, and loan factor (values of 24.633, 4.392, and 1.143) have a great effect on green banking adoption for the IBBL.

Table 12: Parameter Estimates

Banks name		B	Std. Error	Wald	df	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
SONALI BANK LTD.	Intercept	-4.462	3.373	1.750	1	.186			
	Environment	.408	1.443	.080	1	.777	1.504	.089	25.460
	Stakeholder	2.430	1.524	2.541	1	.111	11.362	.573	225.445
	Economic	1.189	1.237	.924	1	.336	3.285	.291	37.129
	Policy	-1.217	1.262	.931	1	.335	.296	.025	3.510
	Loan	-.688	1.364	.254	1	.614	.503	.035	7.288

DUTCH BANGLA BANK LTD.	Intercept	2.788	3.702	.567	1	.451			
	Environment	1.380	1.527	.817	1	.366	3.976	.199	79.281
	Stakeholder	-1.218	1.577	.596	1	.440	.296	.013	6.512
	Economic	-1.146	1.349	.721	1	.396	.318	.023	4.473
	Policy	-.900	1.051	.734	1	.392	.406	.052	3.190
	Loan	.515	1.278	.162	1	.687	1.674	.137	20.504
IFIC BANK LTD.	Intercept	-5.361	3.889	1.901	1	.168			
	Environment	-1.078	1.476	.533	1	.465	.340	.019	6.145
	Stakeholder	4.385	1.742	6.338	1	.012	80.238	2.641	2437.694
	Economic	1.529	1.327	1.327	1	.249	4.613	.342	62.203
	Policy	1.702	1.497	1.294	1	.255	5.488	.292	103.157
	Loan	-4.257	1.753	5.898	1	.015	.014	.000	.440
PUBALI BANK LTD.	Intercept	-4.067	3.866	1.107	1	.293			
	Environment	1.811	2.019	.805	1	.370	6.119	.117	320.281
	Stakeholder	3.721	1.751	4.517	1	.034	41.309	1.336	1277.704
	Economic	2.391	1.427	2.806	1	.094	10.922	.666	179.122
	Policy	-2.089	1.942	1.157	1	.282	.124	.003	5.574
	Loan	-4.204	1.750	5.767	1	.016	.015	.000	.462
ISLAMIC BANK BANGLADESH LTD.	Intercept	-1.428	3.318	.185	1	.667			
	Environment	3.204	1.760	3.316	1	.069	24.633	.783	774.957
	Stakeholder	1.480	1.538	.926	1	.336	4.392	.216	89.425
	Economic	-1.050	1.463	.515	1	.473	.350	.020	6.158
	Policy	-3.132	1.483	4.458	1	.035	.044	.002	.799
	Loan	.134	1.336	.010	1	.920	1.143	.083	15.687

Source: Author's estimation, 2022

Problems in green banking faced by public and private commercial banks

From Table 13, it is clear that lack of training of bank employees was ranked as the highest problem in Bangladesh. Inadequate knowledge of the customers was ranked as the second highest problem with a mean value of 61.67% in the present study area. The third-highest-ranked problem was the high cost of technology and the inability to use those technologies. To improve green banking services, different technologies need to be adopted, like ATM booths, debit and credit cards, etc.

Table 13: Problems in green banking faced by public and private commercial banks

Constraints	5	4	3	2	1	Total	1	2	3	4	5	Total Garret score	Average Garret score	Rank
Inadequate knowledge of the customers	0	4	9	29	18	60	1350	1740	450	160	0	3700	61.67	2
Less priority is given by the board and management.	0	10	16	27	7	60	525	1620	800	400	0	3345	55.75	6
Higher reputational risk by investing in the carbon-intensive sector	0	5	21	27	7	60	525	1620	1050	200	0	3395	56.58	4



High cost of technology and unused to use those technologies	0	2	4	46	8	60	600	2760	200	80	0	3640	60.67	3
Poor Internet network	0	3	13	37	7	60	525	2220	650	120	0	3242	54.03	8
Too new an idea to adopt	0	13	21	26	0	60	0	1560	1050	520	0	3130	52.17	10
Risk of hacking a password	0	18	15	25	2	60	150	1500	750	720	0	3120	52	11
Weaknesses of the solar system	0	14	16	23	7	60	525	1380	800	560	0	3265	54.41	7
Lack of training of bank employees	0	2	2	44	12	60	900	2640	100	80	0	3720	62	1
The customer feels that the transaction cost is high.	0	14	22	23	1	60	75	1380	1100	560	0	3115	51.92	12
Hanging websites due to server breakdown	0	15	18	20	7	60	525	1200	900	600	0	3225	53.75	9
Lack of feelings among employees for the environment and society	0	11	6	41	2	60	150	2460	300	440	0	3350	55.83	5
Garret table value	25	40	50	60	75									

Source: Field Survey, 2022

CONCLUSION

According to the research, Bangladesh's financial industry has led the way in green banking practices since 2011. It demonstrates that the Bangladeshi central bank has undoubtedly contributed significantly to the country's financial system's move toward sustainability. The rule is extensive and maintains a consistent policy focus over eleven years. The green growth vision supporting the political ambitions of the government and green banking regulation are strongly aligned. We contend that the actions taken by central banks and the degree of assistance offered by financial regulators in emerging countries have an impact on long-term outcomes for attaining sustainable development objectives, assisting in a fair transition to a sustainable and green economy.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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