

CHAPTER 4

ANALYSING GREEN BANKING PRACTICES AND PERFORMANCE OF SELECTED INDIAN BANKS

4.1. Introduction

Procedure or method or technique used by an organization to communicate with the outer world is called the Disclosure (Chandra, 1974). Disclosure of information by a corporate entity leads to greater transparency and better discipline in the market. The more information disclosed by an entity, the more it reduces information asymmetry between various stakeholders. It helps the companies to gain stakeholders' confidence (Joshi, 2015).

Environmental issues are a global concern which affects all nations and stakeholders in various ways. Not only organizations have an impact on the environment, but also organizations get affected by the environmental and climatic changes. It is hence important for every entity to report their environmental activities. Green or environmental disclosure has over the time become a significant part of reporting. Entities need to put out green or environmental information in their reports to show case their activities that surpass traditional objective, which is maximization of profit. The corporations closely link their environmental performance with the extent, quality and timeliness of environmental disclosure (Singh, 2013).

Past research work has dealt with the measurement of environmental reporting of corporations using content analysis. However, as evident from the Review of Literature chapter, no such analysis has been done in context of the Indian banking industry. The most important motive to measure banks' environmental performance is that there is an increase in number of eco-friendly businesses that have made it necessary for banks to revise their traditional working models (Bimha & Nhamo, 2017). It will also help to monitor bank's yearly progress towards Green Banking. Green Banking can be understood as adoption and encouragement of eco-friendly practices in both bank's internal and external operations (Bose et al., 2018).

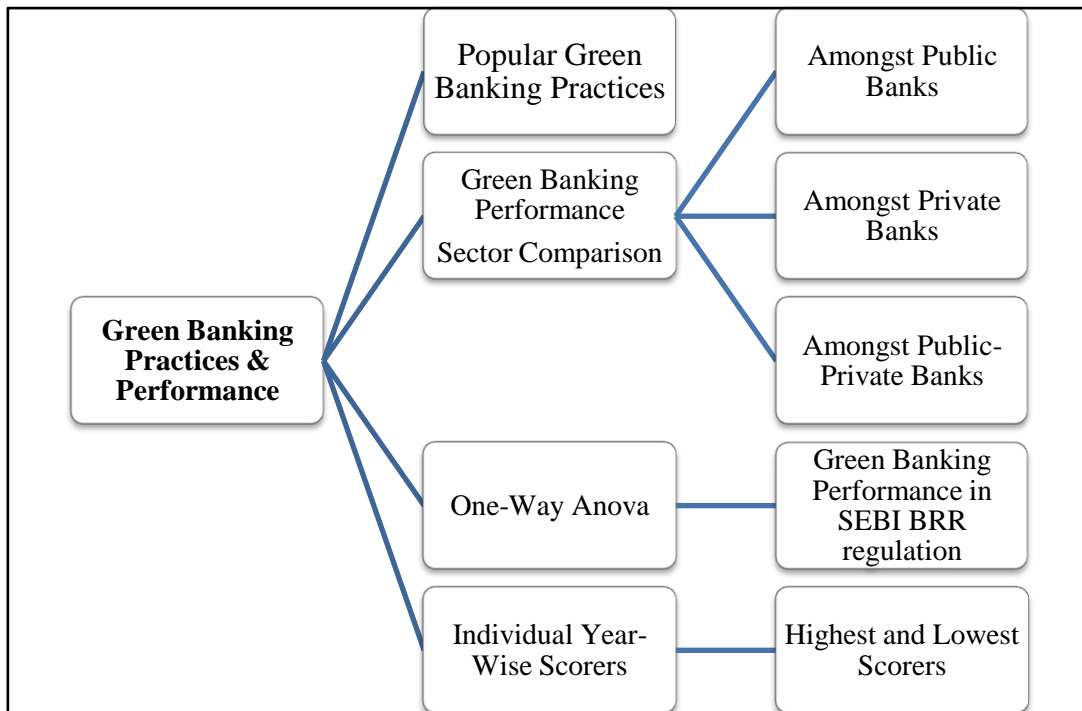
The Indian Banking sector has come a long way since independence. Information disclosure is a necessity not only for the publicly-traded banks, but also for privately-held banks (G20 Green Finance Study Group , 2016).

An index or a tool for measuring green performance of banks is a pre-requisite in this direction. A tool which can be commonly used by banks across nations for comparing their green performance was thus proposed in the Research Methodology chapter. The index is named 'Green Banking Performance Evaluation Index'. The index consists of

99 items and has 14 sub-dimensions and 6 main dimensions. The index is based on the literatures accessible online to the researchers across 19 different portals. Using the index, the Indian commercial banks (Private Sector Banks and Public Sector Banks) are scored. 40 banks form the sample for this objective. The 40 banks are scored for a period of 10 years (2009-2010 to 2018-2019) using their annual reports and additional voluntary reports published by banks for disclosing information on their Green activities.

This chapter has five parts. The first part (Section 4.1) is the introduction. The next part (Section 4.2) discusses the Green Banking practices of the Indian banks. The third part (section 4.3) deals with Green Banking Performance over a period of 10 years (2009-2010 to 2018-2019). The fourth section (4.4) compares Green Banking Performance between Private and Public Sector Banks. Last, the fifth part (Section 4.5) discusses the chapter summary. Below an overview of the analyses to be conducted for Objective 1 is depicted in the form of a diagram for better understanding:

Figure 4.1: Overview of Analyses for Objective 1



Source: Compiled by the researcher

4.2 Green Banking Practices

The practices implemented by banks which are directed towards the environment are the Green Banking Practices. There are various Green Banking Practices which are adopted by banks across the globe. The Green Banking Practices are identified from previous literatures and have been categorised to form the dimensions and sub-dimensions of the Green Banking Performance Evaluation Index (GBPEI). Thus, in the first part of this section, a detailed discussion of various dimensions and sub-dimensions are done. In the second part of this section (4.2.2) an attempt is made to find the popular Green Banking Practices among the Indian banks.

4.2.1 Dimensions and Sub-Dimensions

Various Green Banking practices identified have been clubbed to form 14 sub-dimensions and 6 dimensions. A discussion on the various dimensions is done below.

- **Dimension 1:** The first dimension of GBPEI is ‘Accounting and Finance’. This dimension includes accounting of green activities of banks and includes decisions relating to financing of green activities of banks. This dimension covers the way banks maintain accounts for their green activities, the way banks finance their Green Banking activities and the way banks disclose their Green Banking activities. This dimension has three sub-dimensions which are ‘Green Finance and Investments’, ‘Accounting of Green Initiatives’ and ‘Disclosure and Reporting Practices’. The first sub-dimension ‘Green Finance and Investments’ mainly covers banks’ green lending decisions, green financial products offered by banks, the different stakeholders / sectors to whom green financial products are communicated by banks. The second sub-dimension ‘Accounting of Green Initiatives’ involves measuring the green initiatives, maintaining accounts, budgeting, auditing all the green initiatives of a bank. The third sub-dimension ‘Disclosure and Reporting Practices’ relates to the collection and management of data, reporting of green initiatives, and disclosure of information in various bank reports / websites, or any other medium.
- **Dimension 2:** The second dimension of GBPEI is ‘Marketing, Awards and Capacity Building’. This dimension includes the way banks market their Green Banking image. This dimension covers Green Banking awards that banks and its

stakeholders have received for their environmental activities. This dimension also focuses on the initiatives that banks have taken to increase the capacity of its stakeholders for making them more aware of green activities of banks. It includes 3 sub-dimensions, namely ‘Green marketing and Green CSR’; ‘Capacity Building of Stakeholders’ and ‘Green Awards and Recognition’. The sub-dimension ‘Green marketing and Green CSR’ incorporates the bank's interaction with the society about their green image, their green CSR (Green Corporate Social Responsibility), and their association with environment-oriented NGOs, etc. The next sub-dimension ‘Capacity Building of Stakeholders’ involves the initiatives of banks to educate their employees, create social awareness among different stakeholder groups using seminars, workshops, conferences, etc. This sub-dimension involves capacity-building initiatives of both internal and external stakeholders of a bank. The next sub-dimension ‘Green Awards and Recognition’ refers to green rewards, performance evaluation of banks / branches, certificates, or any other recognition if received by the bank or any other stakeholder(s) to whom the bank is closely attached, for their environment-friendly activities.

- **Dimension 3:** The third dimension of GBPEI is ‘Green HRM’. The Green HRM stands for Green Human Resource Management. It includes all those Green Banking activities that are related to human resource management of a bank. This dimension has two sub-dimensions, namely ‘Procurement and Internalization’ and ‘Office for Green Banking’. The sub-dimension ‘Procurement and Internalization’ is all about how the human resources of a bank are recruited, trained, directed, motivated, and evaluated so that they all act environment-friendly. The sub-dimension 'Office for Green Banking' caters to the setup required in the operations of a bank for managing Green activities of banks like a separate department or a committee.
- **Dimension 4:** The 4th dimension of GBPEI is ‘Mode of Operations’. This dimension includes all those activities that banks adopt in their daily operations to go green like cutting down on usage of paper, issuing e-statements etc. This dimension has three sub-dimensions, namely ‘Paperless Mode of Operations’, ‘Green Building and Infrastructure’ and ‘Resource Usage and Measurement’. The sub-dimension ‘Paperless Mode of Operations’ covers all the activities that are done without using paper. It includes banking delivery channels like

electronic transactions, digital payment modes, and all other technologies that help cut the use of paper. The sub-dimension 'Green Building and Infrastructure' embraces those green initiatives of banks which are related to making the physical infrastructure of bank environment-friendly like green branches, etc. The sub-dimension 'Resource Usage and Measurement' focuses on energy savings of banks, optimum utilizations of resources in banks and minimization of wastages in bank premises.

- **Dimension 5:** The 5th dimension is 'Planning, Policies, and Supervision'. It includes the plans made and policies framed for green activities of bank. Also, it includes supervision and monitoring done by banks for their green activities. This dimension has two sub-dimensions, namely 'Planning and Policies' and 'Green Supervision and Inspection'. The sub-dimension 'Planning and Policies' includes any guideline, policy, strategy, rules, regulations, or any other legislation being made at the level of an individual bank towards Green Banking. The sub-dimension 'Green Supervision and Inspection' covers initiatives of banks wherein it evaluates its clients, and customers about their compliance with environmental regulations.
- **Dimension 6:** The last dimension is 'Risk Management'. It has only one sub-dimension 'Environmental Risk Management'. The sub-dimension 'Environmental Risk Management' discusses the risks faced by the banks because of issues related to the environment. It involves environment risk management strategies, creating environmental risks checklists, monitoring of environmental risks continuously, etc.

4.2.2 Popularity of Green Banking Practices

In this section, an attempt is made to find out the Green Banking Practices that are most popular amongst the scheduled commercial banks. The popularity of Green Banking practices is measured through the popularity of the different dimensions amongst the 40 sample banks. In table 4.1, the total dimension score attained in each year, along with the total Green Banking Performance Evaluation Index (GBPEI) score of each year is illustrated.

Table 4.1: Year-Wise Dimension Score and Total GBPEI score

Dimensions	Year-Wise Dimension Score									
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
D ₁ : Accounting and Finance	88	106	113	168	186	191	235	274	288	282
D ₂ : Marketing, Awards and Capacity Building	61	81	79	107	119	125	146	170	174	161
D ₃ : Green HRM	4	9	16	23	30	34	36	61	83	79
D ₄ : Mode of Operations	263	282	319	353	383	395	430	516	534	513
D ₅ : Planning, Policies, and Supervision	10	12	9	51	59	58	66	97	99	105
D ₆ : Risk Management	1	7	6	16	26	24	27	51	55	62
Total GBPEI Score	427	497	542	718	803	827	940	1169	1233	1202

Source: Compiled by the researcher

In table 4.1 each year's total value of dimensions is stated. For example in 2009-2010, the total value of Dimension 1 scored by all the 40 sample banks is 88. The total GBPEI score of 2009-2010 is 427. In 2010-2011, total score of Dimension 1 is 106, out of total of 497 GBPEI score. On a similar note, Dimension 2's total score in 2009-2010 is 61, out of total GBPEI score of 427. Total score of Dimension 3 in 2009-2010 is 4, total score of Dimension 4 is 263, total score of Dimensions 5 is 10 and total score of Dimension 6 is 1. Likewise, for the other dimensions, for each of the years, the values are calculated and displayed in the table. One key finding from the above table is that over time there is an increase in the total value of all dimensions, which shows Green Banking Performance by banks is increasing not only in one dimension, but in all the dimensions. The values of table 4.1 will be helpful in calculating the proportion of each dimension in the total GBPEI value in a particular year. This will help to find the popularity of the different dimensions amongst the sample banks. Popularity of each dimension over the span of the study is described below in Table 4.2. The formula used for calculating popular dimensions is as follows:

$$PD = \frac{\text{Total Score a Dimension attained}}{\text{Total GBPEI score of a year}} \times 100$$

Where,

PD= Dimension Proportion

Total Score a dimension attained is calculated as cumulative score of each dimension scored by 40 banks (Score of D₁ by bank 1+ Score of D₁ by bank 2 +Score of D₁ by bank 40).

Total GBPEI Score is calculated as the total of Green Banking Performance Evaluation Index score of 40 banks in a year (GBPEI score of bank 1 + GBPEI score of bank 2+GBPEI score of bank 40). Below in Table 4.2, the PD (Dimension Proportion) is illustrated below.

Table 4.2: Popular Dimensions over the Period of Study

Dimens ions	2009 -10	2010 -11	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16	2016 -17	2017 -18	2018 -19
% of D ₁	20.60	21.32	20.84	14.90	23.16	23.09	25	23.43	23.35	23.46
% of D ₂	14.28	16.29	14.57	3.20	14.81	15.11	15.53	14.54	14.11	13.39
% of D ₃	0.93	1.81	2.95	3.20	3.73	4.11	3.82	5.21	6.73	6.57
% of D ₄	61.59	56.74	58.85	49.16	47.69	47.76	45.74	44.14	43.30	42.67
% of D ₅	2.34	2.41	1.66	7.10	7.34	7.01	7.02	8.29	8.02	8.73
% of D ₆	0.23	1.40	1.10	2.22	3.23	2.90	2.87	4.36	4.46	5.15

Source: Compiled by the researcher

In table 4.2, the proportion of each dimension in each year's total GBPEI value is reflected. It can be observed that in each of the years, Dimension 4 (Mode of Operations) form the highest portion of the GBPEI value (marked green). Similarly, over the 10 year study period, Dimension 6 (Risk Management) form the lowest portion of the GBPEI value (marked red). It can be thus concluded that Dimension 4 is most popular, and Dimension 6 is least popular.

However, the question that arises is that each dimensions, have different scores, thus comparing the proportion of dimension score to GBPEI score will not give enough evidence to prove the popularity of a dimension amongst the banks. For confirmation, another analysis is done. In the next analysis, the proportion of each dimension score to total dimension score is calculated. It is done by calculating total items in a dimension spotted in a year to total score a dimension could get in that year. The following formula is used:

$$PIDS = \frac{\text{Total Score of a dimension attained}}{\text{Total score of each dimension}} \times 100$$

Where, PIDS= Proportion of Items in a dimension spotted

Total Score of a dimension attained is calculated as cumulative score of each dimension scored by 40 banks (Score of D₁ by bank 1+ Score of D₁ by bank 2 +Score of D₁ by bank 40).

Total score of each dimension = Number of Items in a dimension × Total number of banks.

Number of Items in each of the dimensions is illustrated in Table 3.5 (Chapter3). The total dimension score attained in each year, along with the total score of each dimensions that can be scored in a year is illustrated below in Table 4.3. For the year 2018-2019, the total dimension score is different as 2 banks namely; Vijaya Bank and Dena Bank were merged with Bank of Baroda and did not have their separate existence. Total number of banks for calculating total Dimension score is 38 for 2018-2019.

Table 4.3: Dimension Score Attained out of Total Dimension Score

Dimensions	Total Score- Dimension Wise (2009-10 to 2017-18)	Total Score Dimension Wise (2018-19)	Total score attained in each dimension									
			2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
1	29×40=1160	29×38=1102	88	106	113	168	186	191	235	274	288	282
2	13×40=520	13×38=494	61	81	79	107	119	125	146	170	174	161
3	10×40=400	10×38=380	4	9	16	23	30	34	36	61	83	79
4	26×40=1040	26×38=988	263	282	319	353	383	395	430	516	534	513
5	12×40=480	12×38=456	10	12	9	51	59	58	66	97	99	105
6	9×40=360	9×38=342	1	7	6	16	26	24	27	51	55	62

Source: Compiled by the researcher

In table 4.3, the total value a dimension can score is shown in the second column and third column. Also, year-wise dimension score attained is depicted in the table. Table 4.3 will help to calculate the percentage of items of a dimension spotted in a year among the sample banks. That will show the degree to which banks have performed across different dimensions.

Table 4.4: Percentage of Items Reported in Dimensions over the Study Period

Dimensions	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
% of Items of D ₁	7.58	9.13	9.74	14.48	16.03	16.46	20.25	23.62	24.82	25.58
% of Items of D ₂	11.73	15.57	15.19	20.57	22.88	24.03	6.9	11.73	33.46	32.59

% of Items of D ₃	1	2.25	4	5.75	7.5	8.5	9	15.25	20.75	20.78
% of Items of D ₄	25.28	27.11	30.67	33.94	36.82	37.98	41.34	49.61	51.34	51.92
% of Items of D ₅	2.08	2.5	1.87	10.62	12.29	12.08	13.75	20.20	20.62	23.02
% of Items of D ₆	0.27	1.94	1.66	4.44	7.22	6.66	7.5	14.16	15.27	18.12

Source: Compiled by the researcher

Table 4.4 above states the proportion of items of a particular dimension spotted in a year. It can be seen that throughout the 10 years, Dimension 4 (Mode of Operations) have the highest items represented when compared to total dimension score. It means dimension 4 have the highest number of items reported. It means in each of the years, banks have adopted maximum green activities of dimension 4. This further supports the previous findings of Table 4.2 (Popular Dimensions over the Period of Study). It can be seen that in 8 out of 10 years Dimension 6 (Risk Management) have the lowest number of items reported. It means in majority of the years, green activities relating to Dimension 6 is least adopted by the Indian banks. This further supports the findings of Table 4.2. Another key outcome of the table is that each of the dimensions, except dimension 2, have the highest representation of their items in the year 2018-19. Only dimension 2 has the maximum representation in the year 2017-18. Thus, Green Banking practices in each of the dimensions are being disclosed and practiced more by banks with time. Thus, it can be concluded that the most popular dimension of Green Banking among Indian scheduled commercial banks is ‘Mode of Operations’. Indian banks have adopted maximum Green Banking activities that relate to cutting down of papers, using electronic and digital technology, have opted for green infrastructure and have focused on optimum utilization of resources and renewable energy sources. Also, the least popular dimension is ‘Risk Management’. Indian banks have adopted fewer Green Banking activities in the direction of managing the risks arising out of various environmental activities.

4.3. Year-Wise Green Banking Performance

This section looks at the performance of banks across the years. Manual Content analysis is used to score the 40 banks based on their reports. This section mainly captures the Year-Wise performance. Green Banking Scorecard for the 10 years from

2009-2010 to 2018-2019 for the Indian commercial banks are stated below. It mainly attempts to address the following research questions:

RQ1) What is the status of Indian banks' Green Banking efforts?

RQ2) What is the minimum and maximum Green Banking Score of banks over the years?

RQ3) Have banks in India improved their green performance over time?

RQ4) Which year recorded the maximum and minimum change in Green Banking Performance?

RQ5) Is there any difference between the mean GBPEI scores of Phase 1, Phase 2 and Phase 3 of SEBI Business Responsibility Report regulation?

The first research question is addressed by presenting a scorecard for every year. Total scores for all the 40 banks in a year is cumulated and depicted below. Also, each year's industry average (mean Green Banking Performance Evaluation Score) is taken as a base to find those banks that have outperformed the industry average in each year.

Table 4.5: Green Banking Performance Evaluation Score for 2009-2010

Public Sector Banks	Score	Private Sector Bank	Score
State Bank of India	26	ICICI Bank	27
Bank of Baroda	18	Jammu & Kashmir Bank	26
Corporation Bank	16	IndusInd Bank	25
Syndicate Bank	15	South Indian Bank	18
Bank of Maharashtra	13	YES Bank	16
Dena Bank	12	Axis Bank	13
Andhra Bank	11	HDFC Bank	12
Bank of India	11	Kotak Mahindra Bank	11
IDBI Bank	11	Tamilnad Mercantile Bank	8
Central Bank of India	10	Karur Vysya Bank	8
Oriental Bank of Commerce	9	Lakshmi Vilas Bank	7
Allahabad Bank	8	DCB Bank	7
Canara Bank	8	Catholic Syrian Bank	6
Union Bank	8	Federal Bank	6
United Bank of India	8	City Union Bank	5
Vijaya Bank	8	RBL Bank	5
Indian Bank	7	Dhanlaxmi Bank	2
Punjab National Bank	7	Karnataka Bank	2

UCO Bank	7	Nainital Bank	1
Indian Overseas Bank	6	Total	205
Punjab & Sind Bank	3		
Total	222		
Mean GBPES		10.67	

Source: Compiled by the researcher

Table 4.5 depicts the Green Banking Performance evaluation Score (GBPES) for 2009-2010. The maximum score in the year 2009-2010 is 27 which is scored by ICICI Bank, followed by a score of 26 by State Bank of India (SBI) and Jammu and Kashmir Bank, and a score of 25 by IndusInd Bank. The lowest score is scored by Nainital Bank (Score of 1), followed by Dhanlaxmi Bank and Karnataka Bank, both scoring 2 and the third lowest score is scored by Punjab and Sind Bank. In the table, banks that have scored higher than the mean GBPES are: State Bank of India, Bank of Baroda, Corporation Bank, Syndicate Bank, Bank of Maharashtra, Dena Bank, Andhra Bank, Bank of India, IDBI Bank, ICICI Bank, Jammu & Kashmir Bank, IndusInd Bank, South Indian Bank, YES Bank, Axis Bank, HDFC Bank and Kotak Mahindra Bank. The next table (Table 4.6) contains the GBPES for the year 2010-2011.

Table 4.6: Green Banking Performance Evaluation Score for 2010-2011

Public Sector Bank	Score	Private Sector Bank	Score
Punjab National Bank	35	IndusInd Bank	48
State Bank of India	27	HDFC Bank	22
Bank of Baroda	22	YES Bank	21
Syndicate Bank	19	Kotak Mahindra Bank	19
IDBI Bank	18	South Indian Bank	17
Bank of India	12	ICICI Bank	15
Corporation Bank	12	Dhanlaxmi Bank	12
Dena Bank	12	Jammu & Kashmir Bank	11
Union Bank	11	Karur Vysya Bank	11
Indian Overseas Bank	10	Axis Bank	10
Oriental Bank of Commerce	10	Catholic Syrian Bank	9
Bank of Maharashtra	10	Tamilnad Mercentile Bank	9
Andhra Bank	9	Federal Bank	7
United Bank of India	9	Lakshmi Vilas Bank	6
Central Bank of India	8	City Union Bank	5
Indian Bank	8	DCB Bank	4
UCO Bank	8	RBL Bank	4
Allahabad Bank	7	Nainital Bank	3
Vijaya Bank	7	Karnataka Bank	1
Canara Bank	6	Total	234
Punjab & Sind Bank	3		

Total	263		
Mean GBPES		12.425	

Source: Compiled by the researcher

Table 4.6 states the scores of individual banks in the year 2010-2011. The maximum score in the year 2010-2011 is scored by IndusInd Bank, followed by Punjab National Bank and the third highest score is scored by SBI. The lowest scorer is Karnataka Bank, followed by Nainital Bank and Punjab and Sind Bank, both scoring 3, and the third lowest scorers of the year are DCB Bank and RBL Bank. The mean GBPES of 2010-11 is 12.42. Banks that have scored higher than the mean GBPES are: Punjab National Bank, State Bank of India, Bank of Baroda, Syndicate Bank, IDBI Bank, IndusInd Bank, HDFC Bank, YES Bank, Kotak Mahindra Bank, South Indian Bank and ICICI Bank. The next table (Table 4.7) contains individual scores of each of the banks for the year 2011-2012.

Table 4.7: Green Banking Performance Evaluation Score for 2011-2012

Public Sector Banks	Score	Private Sector Banks	Score
State Bank of India	28	IndusInd Bank	47
Punjab National Bank	28	YES Bank	38
Bank of Baroda	20	ICICI Bank	26
Indian Overseas Bank	16	Axis Bank	24
Syndicate Bank	16	Karur Vysya Bank	17
Bank of India	14	HDFC Bank	16
IDBI Bank	14	Kotak Mahindra Bank	15
Corporation Bank	13	Federal Bank	13
Bank of Maharashtra	12	Jammu & Kashmir Bank	12
Union Bank	11	South Indian Bank	12
United Bank of India	11	Catholic Syrian Bank	9
Andhra Bank	10	DCB Bank	9
Oriental Bank of Commerce	10	Tamilnad Mercantile Bank	9
Dena Bank	9	City Union Bank	8
Indian Bank	9	Dhanlaxmi Bank	7
Central Bank of India	8	Lakshmi Vilas Bank	7
Vijaya Bank	8	Nainital Bank	6
Allahabad Bank	7	RBL Bank	4
UCO Bank	7	Karnataka Bank	2
Canara Bank	6	Total	281
Punjab & Sind Bank	4		
Total	261		
Mean GBPES		13.55	

Source: Compiled by the researcher

The maximum score in the year 2011-2012 is secured by IndusInd Bank. The second highest scorer is YES Bank, and the third highest scorers are SBI and Punjab National Bank. The lowest score is scored by Karnataka Bank, followed by RBL Bank and Punjab and Sind Bank both scoring 4, and the third lowest scorers are Canara Bank and Nainital Bank. The mean GBPES of 2011-12 is 13.55. Banks that have scored higher than the mean GBPES are: State Bank of India, Punjab National Bank, Bank of Baroda, Indian Overseas Bank, Syndicate Bank, Bank of India, IDBI Bank, IndusInd Bank, YES Bank, ICICI Bank, Axis Bank, Karur Vysya Bank, HDFC Bank and Kotak Mahindra Bank. Table 4.8 below includes the scorecard of the 40 banks for the year 2012-2013.

Table 4.8: Green Banking Performance Evaluation Score for 2012-2013

Public Sector Banks	Score	Private Sector Banks	Score
SBI and its Associate Banks	36	IndusInd Bank	49
Bank of Baroda	36	YES Bank	49
Punjab National Bank	32	HDFC Bank	42
Bank of India	28	Axis Bank	41
Union Bank	28	Kotak Mahindra Bank	36
Canara Bank	27	ICICI Bank	21
Central Bank of India	17	Tamilnad Mercantile Bank	13
Syndicate Bank	17	Dhanlaxmi Bank	11
Indian Bank	16	Federal Bank	11
Indian Overseas Bank	16	Catholic Syrian Bank	10
IDBI Bank	16	South Indian Bank	10
United Bank of India	14	Jammu & Kashmir Bank	9
Oriental Bank of Commerce	13	Karnataka Bank	8
UCO Bank	13	Karur Vysya Bank	8
Corporation Bank	11	DCB Bank	8
Bank of Maharashtra	10	RBL Bank	7
Dena Bank	9	City Union Bank	6
Andhra Bank	9	Nainital Bank	6
Vijaya Bank	8	Lakshmi Vilas Bank	5
Allahabad Bank	7	Total	350
Punjab & Sind Bank	5		
Total	368		
Mean GBPES		17.95	

Source: Compiled by the researcher

In the year 2012-2013, the highest score is scored by IndusInd Bank and YES Bank. The second highest score is scored by HDFC Bank, followed by Axis Bank. The lowest scorers are Lakshmi Vilas Bank and Punjab and Sind Bank. The second lowest scorers are City Union Bank Ltd and Nainital Bank and the third lowest scorers are Allahabad

Bank and RBL Bank. The mean GBPES of 2012-13 is 17.95. Banks that have scored higher than the mean GBPES are: State Bank of India, Bank of Baroda, Punjab National Bank, Bank of India, Union Bank, Canara Bank, IndusInd Bank, YES Bank, HDFC Bank, Axis Bank, Kotak Mahindra Bank, and ICICI Bank. The next table (table 4.9) elucidates the GBPES of each bank for the year 2013-2014.

Table 4.9: Green Banking Performance Evaluation Score for 2013-2014

Public Sector Banks	Score	Private Sector Banks	Score
Bank of Baroda	46	HDFC Bank	57
State Bank of India	39	YES Bank	53
Bank of India	34	IndusInd Bank	51
Indian Bank	34	Axis Bank	47
Punjab National Bank	34	Kotak Mahindra Bank	40
Union Bank	31	ICICI Bank	27
Canara Bank	30	Federal Bank	12
IDBI Bank	27	South Indian Bank	11
Central Bank of India	16	RBL Bank	10
Indian Overseas Bank	15	Catholic Syrian Bank	10
Syndicate Bank	15	Dhanlaxmi Bank	9
United Bank of India	15	Jammu & Kashmir Bank	8
UCO Bank	13	DCB Bank	8
Andhra Bank	12	Karur Vysya Bank	8
Oriental Bank of Commerce	12	Karnataka Bank	7
Corporation Bank	11	Nainital Bank	7
Dena Bank	9	Tamilnad Mercantile Bank	6
Vijaya Bank	9	Lakshmi Vilas Bank	6
Bank of Maharashtra	8	City Union Bank	5
Allahabad Bank	7	Total	382
Punjab & Sind Bank	4		
Total	421		
Mean GBPES		20.07	

Source: Compiled by the researcher

The highest scorer of the year 2013-2014 is HDFC Bank, followed by YES bank, and the third highest scorer is IndusInd Bank. The lowest score is scored by Punjab and Sind Bank, followed by City Union Bank, and the third lowest score of 6 is scored by Lakshmi Vilas Bank and Tamilnad Mercantile Bank. The mean GBPES of 2013-14 is 20.07. Banks that outperformed the industry average are: Bank of Baroda, State Bank of India, Bank of India, Indian Bank, Punjab National Bank, Union Bank, Canara Bank, IDBI Bank Bank, HDFC Bank, YES Bank, Axis Bank, IndusInd Bank, Kotak Mahindra

Bank and ICICI Bank. For the next year that is 2014-2015, the scorecard is displayed in Table 4.10.

Table 4.10: Green Banking Performance Evaluation Score for the year 2014-2015

Public Sector Banks	Score	Private Sector Banks	Score
Bank of Baroda	51	YES Bank	55
State Bank of India	37	Axis Bank	49
Canara Bank	34	IndusInd Bank	49
Punjab National Bank	33	HDFC Bank	47
Union Bank	30	Kotak Mahindra Bank	41
Syndicate Bank	29	ICICI Bank	34
Indian Bank	26	Jammu & Kashmir Bank	16
Bank of India	25	Federal Bank	15
IDBI Bank	22	Karur Vysya Bank	14
Oriental Bank of Commerce	15	Karnataka Bank	12
Central Bank of India	14	South Indian Bank	12
Andhra Bank	14	DCB Bank	10
UCO Bank	13	Tamilnad Mercentile Bank	10
Indian Overseas Bank	12	Dhanlaxmi Bank	9
Corporation Bank	10	Catholic Syrian Bank	9
Bank of Maharashtra	10	City Union Bank	8
Vijaya Bank	10	RBL Bank	8
Dena Bank	8	Nainital Bank	7
Allahabad Bank	8	Lakshmi Vilas Bank	6
United Bank of India	8	Total	411
Punjab & Sind Bank (PSB)	7		
Total	416		
Mean GBPES		20.67	

Source: Compiled by the researcher

The highest scorer of the year 2014-2015 is YES Bank, followed by Bank of Baroda, and the third highest scorers are Axis Bank and IndusInd Bank. The lowest score is scored by Lakshmi Vilas Bank; the second lowest score is secured by Punjab and Sind Bank and Nainital Bank. Third lowest score is secured by Allahabad bank, United Bank of India, RBL Bank and City Union bank. The mean GBPES of 2014-15 is 20.67. In 2014-2015, the banks that have scored higher than the mean GBPES are: Bank of Baroda, State Bank of India, Canara Bank, Punjab National Bank, Union Bank, Syndicate Bank, Indian Bank, Bank of India, IDBI Bank, Yes Bank, Axis Bank, IndusInd Bank, HDFC Bank, Kotak Mahindra Bank and ICICI Bank. The GBPES of each bank for the year 2015-2016 is illustrated below in Table 4.11.

Table 4.11: Green Banking Performance Evaluation Score for 2015-2016

Public Sector Banks	Score	Private Sector Banks	Score
State Bank of India	45	HDFC Bank	59
Punjab National Bank	41	YES Bank	58
Indian Bank	38	Axis Bank	57
IDBI Bank	35	IndusInd Bank	49
Canara Bank	34	Kotak Mahindra Bank	39
Bank of Baroda	32	ICICI Bank	35
Syndicate Bank	28	RBL Bank	22
Union Bank	28	Jammu & Kashmir Bank	22
Bank of India	25	South Indian Bank	18
Allahabad Bank	21	DCB Bank	16
Vijaya Bank	21	Federal Bank	16
United Bank of India	18	Karur Vysya Bank	12
Corporation Bank	15	Dhanlaxmi Bank	11
Dena Bank	15	City Union Bank	11
Andhra Bank	13	Catholic Syrian Bank	10
Central Bank of India	13	Lakshmi Vilas Bank	10
Indian Overseas Bank	11	Nainital Bank	10
UCO Bank	11	Tamilnad Mercentile Bank	10
Bank of Maharashtra	10	Karnataka Bank	8
Punjab & Sind Bank (PSB)	7	Total	473
Oriental Bank of Commerce (OBC)	6		
Total	467		
Mean GBPES		23.5	

Source: Compiled by the researcher

The maximum score in the year 2015-2016 is 59 which is scored by HDFC Bank, followed by YES Bank. The third highest scorer of the year is Axis Bank. The lowest score is scored by OBC, followed by Punjab and Sind Bank. The third highest lowest score is secured by Karnataka Bank. Banks that outperformed the industry average of 23.5 in the year 2015-16 are: State Bank of India, Punjab National Bank, Indian Bank, IDBI Bank, Bank of Baroda, Syndicate Bank, Union bank, Bank of India, Canara Bank, HDFC Bank, YES Bank, Axis Bank, IndusInd Bank, Kotak Mahindra Bank and ICICI Bank. The GBPES of 2016-2017 for the 40 sample banks are described below.

Table 4.12: Green Banking Performance Evaluation Score for 2016-2017

Public Sector Banks	Score	Private Sector Banks	Score
State Bank of India	50	YES Bank	61
Punjab National Bank	38	Axis Bank	60
Canara Bank	37	HDFC Bank	51
Corporation Bank	37	IndusInd Bank	51

IDBI Bank	37	ICICI Bank	38
Andhra Bank	36	RBL Bank	37
Indian Bank	36	Karur Vysya Bank	31
Oriental Bank of Commerce	36	Kotak Mahindra Bank	30
Union Bank	31	Jammu & Kashmir Bank	26
UCO Bank	31	Karnataka Bank	26
Syndicate Bank	30	South Indian Bank	25
Bank of Baroda	28	DCB Bank	22
Bank of India	29	Federal Bank	20
Vijaya Bank	27	City Union Bank	15
United Bank of India	25	Tamilnad Mercantile Bank	13
Central Bank of India	23	Nainital Bank	10
Bank of Maharashtra	22	Catholic Syrian Bank	10
Punjab & Sind Bank	21	Dhanlaxmi Bank	9
Allahabad Bank	19	Lakshmi Vilas Bank	9
Dena Bank	19	Total	544
Indian Overseas Bank	13		
Total	625		
Mean GBPES		29.22	

Source: Compiled by the researcher

The highest scorer for the year 2016-2017 is YES Bank. The second highest scorer is Axis Bank and the third highest scorer is HDFC Bank. The lowest score is secured by Dhanlaxmi Bank and Lakshmi Vilas Bank. The second lowest scorers of the year 2016-2017 are Catholic Syrian Bank and Nainital Bank. The third lowest scorers of the year are Indian Overseas Bank and Tamilnad Mercantile Bank. Banks that outperformed the industry average of 29.22 are: State Bank of India, Punjab National Bank, Canara Bank, Corporation Bank, IDBI Bank, Andhra Bank, Indian Bank, Oriental Bank of Commerce, Union Bank, UCO Bank, Syndicate Bank, YES Bank, Axis Bank, HDFC Bank, IndusInd Bank, ICICI Bank, RBL Bank, Karur Vysya Bank and Kotak Mahindra Bank. In total, 19 out of 40 banks (47.5%) have scored higher than the average in this year. This year has seen a significant rise in proportion of banks performing better than the industry average score. The scorecard for the sample banks for the year 2017-2018 is displayed below in Table 4.13.

Table 4.13: Green Banking Performance Evaluation Score for 2017-2018

Public Sector Banks	Score	Private Sector Banks	Score
State Bank of India	56	YES Bank	66
Canara Bank	41	Axis Bank	59
Corporation Bank	39	HDFC Bank	59
Andhra Bank	37	IndusInd Bank	56

Punjab National Bank	36	RBL Bank	42
Oriental Bank of Commerce	35	Kotak Mahindra Bank	40
UCO Bank	33	ICICI Bank	35
IDBI Bank	33	Karur Vysya Bank	34
Syndicate Bank	33	City Union Bank	28
Bank of Baroda	32	Jammu & Kashmir Bank	28
Indian Bank	32	South Indian Bank	28
Bank of India	30	Karnataka Bank	23
Union Bank	30	Federal Bank	22
Vijaya Bank	26	DCB Bank	20
Central Bank of India	25	Lakshmi Vilas Bank	14
Indian Overseas Bank	22	Tamilnad Mercantile Bank	13
Bank of Maharashtra	21	Catholic Syrian Bank	13
Allahabad Bank	21	Dhanlaxmi Bank	11
Punjab & Sind Bank	20	Nainital Bank	10
Dena Bank	17	Total	601
United Bank of India	13		
Total	632		
Mean GBPES		30.82	

Source: Compiled by the researcher

The highest scorer is YES bank, followed by Axis Bank and HDFC Bank. The third highest scorers are SBI and IndusInd Bank. The lowest scorer is Nainital Bank, followed by Dhanlaxmi Bank. Third lowest score is secured by United Bank of India, Tamilnad Mercantile Bank and Catholic Syrian Bank. The mean GBPES for the year 2017-18 is 30.82. Banks that have scored higher than the mean GBPES in the year 2017-18 are: State Bank of India, Canara Bank, Corporation Bank, Andhra Bank, Punjab National Bank, Oriental Bank of Commerce, UCO Bank, IDBI Bank, Syndicate Bank, Bank of Baroda, Indian Bank, YES Bank, Axis Bank, HDFC Bank, IndusInd Bank, RBL Bank, Kotak Mahindra Bank, ICICI Bank and Karur Vysya Bank. 19 out of 40 banks (47.5%) have scored higher than the industry average. The Green Banking Performance Evaluation Score for 2018-2019 is tabulated below:

Table 4.14: Green Banking Performance Evaluation Score for 2018-2019

Public Sector Banks	Score	Private Sector Banks	Score
State Bank of India	59	YES Bank	71
Punjab National Bank	44	HDFC Bank	64
Andhra Bank	37	IndusInd Bank	61
Corporation Bank	37	Axis Bank	56
Union Bank	36	ICICI Bank	50
Canara Bank	34	Kotak Mahindra Bank	40
Bank of Baroda	33	RBL Bank	34
IDBI Bank	32	Karur Vysya Bank	31

Indian Bank	32	Jammu & Kashmir Bank	28
Oriental Bank of Commerce	31	Karnataka Bank	26
UCO Bank	31	South Indian Bank	25
United Bank of India	30	Federal Bank	24
Bank of India	29	City Union Bank	23
Syndicate Bank	29	DCB Bank	21
Indian Overseas Bank	25	Catholic Syrian Bank	13
Central Bank of India	24	Lakshmi Vilas Bank	12
Bank of Maharashtra	20	Nainital Bank	11
Allahabad Bank	20	Tamilnad Mercantile Bank	11
Punjab & Sind Bank	9	Dhanlaxmi Bank	9
Dena Bank	-	Total	610
Vijaya Bank	-		
Total	592		
Mean GBPES		31.63	

Source: Compiled by the researcher

The highest scorer is YES bank Ltd, followed by HDFC Bank and IndusInd Bank. The lowest score is secured by Punjab and Sind Bank and Dhanlaxmi Bank, followed by Nainital Bank and Tamilnad Mercantile Bank. The third lowest score is secured by Lakshmi Vilas Bank. The mean GBPES for the year 2018-19 is 31.63. Banks that have scored higher than the industry average are: State Bank of India, Punjab National Bank, Andhra Bank, Corporation Bank, Union Bank, Canara Bank, Bank of Baroda, IDBI Bank, Indian Bank, YES Bank, HDFC Bank, IndusInd Bank, Axis Bank, ICICI Bank, Kotak Mahindra Bank and RBL Bank. In total, 16 out of 40 banks (40%) have scored higher than the average in 2018-2019.

Few of the banks have always outperformed the industry average throughout the 10 years, which are: State Bank of India (Public Sector Bank); Private Sector Bank: HDFC Bank, ICICI Bank, IndusInd Bank, Kotak Mahindra Bank and YES Bank. Several other banks have outperformed the industry average for 9 years out of 10 years, namely, Public Sector Bank: Bank of Baroda, Punjab National Bank and IDBI Bank; Private Sector Bank: Axis Bank. All these banks can be considered as good performers as they have outperformed industry average for a significant number of years.

Below a GBPEI Scorecard for all the banks is depicted to have a holistic picture of Green Banking Performance over the study period. A clubbed GBPEI Scorecard will make it easier to comprehend the Green Banking Performance over the study period. The table below is bifurcated into two parts. One part depicts the GBPEI scores of Public Sector Banks and the other part shows the GBPEI scorecard of Private Sector

Banks. In table 4.15, the green marked values are the highest GBPEI values in a particular year of a particular sector (Public/Private) and the red marked values are the lowest GBPEI values in a particular year of a particular sector (Public/Private).

Table 4.15: GBPEI Scores of Banks from 2009-10 to 2018-19

Public Sector Banks	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Allahabad Bank	8	7	7	7	7	8	21	19	21	20
Andhra Bank	11	9	10	9	12	14	13	36	37	37
Bank of Baroda	18	22	20	36	46	51	32	28	32	33
Bank of India	11	12	14	28	34	25	25	29	30	29
Bank of Maharashtra	13	10	12	10	8	10	10	22	21	20
Canara Bank	8	6	6	27	30	34	34	37	41	34
Central Bank of India	10	8	8	17	16	14	13	23	25	24
Corporation Bank	16	12	13	11	11	10	15	37	39	37
Indian Bank	7	8	9	16	34	26	38	36	32	32
Indian Overseas Bank	6	10	16	16	15	12	11	13	22	25
IDBI Bank	11	18	14	16	27	22	35	37	33	32
Oriental Bank of Commerce	9	10	10	13	12	15	6	36	35	31
Punjab & Sind Bank	3	3	4	5	4	7	7	21	20	9
Punjab National Bank	7	35	28	32	34	33	41	38	36	44
State Bank of India	26	27	28	36	39	37	45	50	56	59
Syndicate Bank	15	19	16	17	15	29	28	30	33	29
UCO Bank	7	8	7	13	13	13	11	31	33	31
Union Bank	8	11	11	28	31	30	28	31	30	36
United Bank of India	8	9	11	14	15	8	18	25	13	30
Total	222	263	261	368	421	416	467	625	632	592
Private Sector Banks	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Axis Bank	13	10	24	41	47	49	57	60	59	56
Catholic Syrian Bank	6	9	9	10	10	9	10	10	13	13
City Union Bank	5	5	8	6	5	8	11	15	28	23
DCB Bank	7	4	9	8	8	10	16	22	20	21
Dena Bank	12	12	9	9	9	8	15	19	17	-
Dhanlaxmi Bank	2	12	7	11	9	9	11	9	11	9
Federal Bank	6	7	13	11	12	15	16	20	22	24
HDFC Bank	12	22	16	42	57	47	59	51	59	64
ICICI Bank	27	15	26	21	27	34	35	38	35	50
IndusInd Bank	25	48	47	49	51	49	49	51	56	61
Jammu and Kashmir Bank	26	11	12	9	8	16	22	26	28	28
Karnataka Bank	2	1	2	8	7	12	8	26	23	26
Karur Vysya Bank Ltd	8	11	17	8	8	14	12	31	34	31
Kotak Mahindra Bank	11	19	15	36	40	41	39	30	40	40
Lakshmi Vilas Bank Ltd	7	6	7	5	6	6	10	9	14	12
Nainital Bank	1	3	6	6	7	7	10	10	10	11
RBL Bank Ltd	5	4	4	7	10	8	22	37	42	34
South Indian Bank	18	17	12	10	11	12	18	25	28	25
Tamilnad Mercantile Bank Ltd	8	9	9	13	6	10	10	13	13	11
Vijaya Bank	8	7	8	8	9	10	21	27	26	-
YES Bank	16	21	38	49	53	55	58	61	66	71
Total	205	234	281	350	382	411	473	544	601	610

Source: Compiled by the researcher

Over the 10 year period, among Public Sector Banks, for 7 years, State Bank of India has been scoring the highest. Punjab and Sind Bank has been for majority of the years the lowest scorer among Public Sector Banks. Among Private Sector Banks, YES bank has been the scoring the highest for 5 out of 10 years, followed by IndusInd bank. Among lowest scorers, Lakshmi Vilas bank, Karnataka Bank, Nainital Bank, Dhanlaxmi Bank has scored the lowest in more than one year. Thus, it shows the supremacy of few banks in the domain of Green Banking. Another thing to be concluded is that there are consistently weak performers in Green Banking in each of the sectors. Those performing weak have performed poorly throughout the 10 years. Thus, that brings into light the difference in involvement of the various banks in India in Green Banking.

From the discussion held above, below a summary of findings of Table 4.5 - 4.15 is given. Table 4.16 highlights the highest and lowest scorers among the 40 sample banks in the 10 year study period.

Table 4.16: Highest and Lowest Scorer Banks

Years	Highest Scorer	Lowest Scorer
2009-2010	ICICI Bank	Nainital Bank
2010-2011	IndusInd Bank	Karnataka Bank
2011-2012	IndusInd Bank	Karnataka Bank
2012-2013	IndusInd Bank YES Bank	Lakshmi Vilas Bank Punjab and Sind Bank
2013-2014	HDFC Bank	Punjab and Sind Bank
2014-2015	YES Bank	Lakshmi Vilas Bank
2015-2016	HDFC Bank	Oriental Bank of Commerce
2016-2017	YES Bank	Dhanlaxmi Bank Lakshmi Vilas Bank
2017-2018	YES Bank	Nainital Bank
2018-2019	YES Bank	Punjab and Sind Bank Dhanlaxmi Bank

Source: Compiled by researcher

It is evident from the above analysis that in all the 10 years, Private Banks have been the highest scorer. Also, in most of the years Private Banks have been the lowest scorers too. Thus, Private Banks have been on the both extreme, which shows certain Private Banks have outperformed all other Private Banks and Public Banks. Also, it shows certain Private Banks have been the weakest players when it comes to participation in Green Banking.

Next, the following two research questions are addressed:

RQ2. Have banks in India improved their green performance over time?

RQ3. What is the minimum and maximum Green Banking Score over the years?

To address the above two research questions, descriptive statistics is calculated for each of the years, which are portrayed below in Table 4.17.

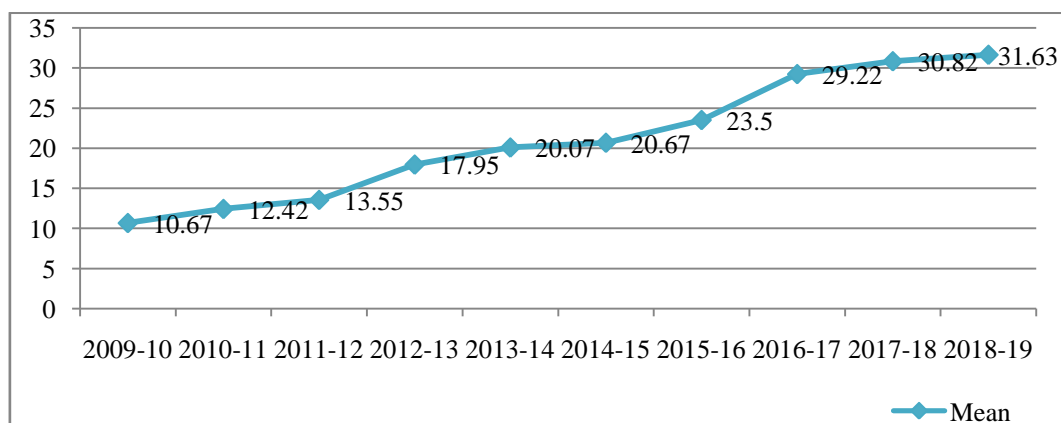
Table 4.17: Yearly Descriptive Statistics of GBPEI

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
N Valid	40	40	40	40	40	40	40	40	40	38
Missing	0	0	0	0	0	0	0	0	0	2
Range	26.0	47.0	45.0	44.0	53.0	49.0	53.0	52.0	56.0	62
Minimum	1.0	1.0	2.0	5.0	4.0	6.0	6.0	9.0	10.0	9
Maximum	27.0	48.0	47.0	49.0	57.0	55.0	59.0	61.0	66.0	71

Source: Compiled by the researcher

Table 4.17 depicts the range, minimum and maximum value of Green Banking Performance Evaluation Score (GBPES) for the 40 banks over the 10 year period. It can be noted that the minimum value of GBPEI has increased from 1 in 2009-10 to 10 in 2018-19. There is also an increase in the maximum score attained by Indian bank over the years from 27 to 71. The minimum and maximum value has shown the gradual improvement in Green Banking Performance in the Indian banking system. The difference (range) between the highest and lowest GBPEI has increased gradually over the years. Range value starts from 26 and the maximum range value is observed in 2018-2019 which is 62. The range depicts that the inequality in Green Banking Performance has in fact increased among the banks over time. For mean, line graph is used. Diagrammatically it will be easier to comprehend the trend of mean over the study period.

Figure 4.2: Mean of GBPEI from 2009-10 to 2018-19



Source: Compiled by the researcher

Figure 4.2 depicts the mean Green Banking Performance Evaluation Score (GBPES) for the 40 banks over the 10 year period. There is a gradual increase in the GBPES and there is a significant change in average score in 2012-13 and in 2016-2017. The average score in the year 2009-2010 is 10.675 and in the year 2018-2019 is 31.63. This shows there is a notable increase in the GBPES average score over the 10 year period. Thus, a difference of Green Banking Performance over the years can be seen. The increase in GBPES is may be due to the increase in awareness about environmental responsibilities of banks and the rising concerns of stakeholders. The last analysis of this section addresses the fourth research question, which is ‘which year recorded the maximum and minimum change in Green Banking Performance?’ Annual Growth Rate of Green Banking Performance Evaluation Index is used to measure the change in the Green Banking Performance of the Indian banks. The formula for calculating the Annual Growth Rate is taken from (Sarma & Roy, 2021; CFI Team, 2022).

$$AGR = \frac{N_{t+1} - N_t}{N_t} \times 100$$

Where, AGR = Annual Growth Rate; N_{t+1} =Green Banking Performance Evaluation Score in t + 1 years; N_t = Green Banking Performance Evaluation Score in t years

The value for Green Banking Performance Evaluation Index for one year is calculated as follows:

$$GBPEI_T = \sum_{i=1}^{40} GBPEI$$

Where, $GBPEI_T$ = Total Score of Green Banking Performance Evaluation Index,
 $GBPEI_i$ = Score of Green Banking Performance Evaluation Index of 1 bank, i = Number
of banks

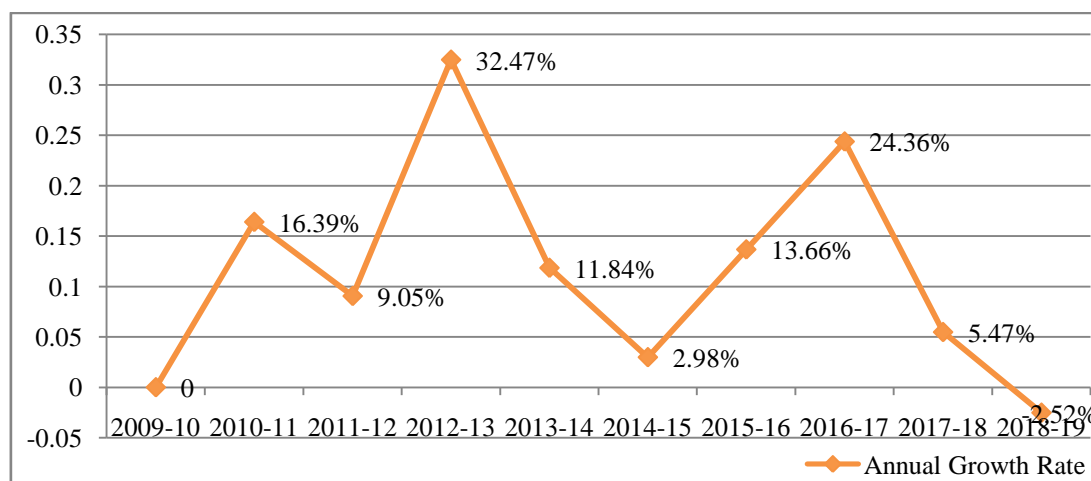
The table below (table 4.18) includes the total score of Green Banking Performance
Evaluation Index based on which the annual growth rate is depicted in Figure 4.3.

Table 4.18: Total score and Annual Growth Rate of GBPEI

Year	Total Score of Public Sector Banks (A)	Total Score of Private Sector Banks (B)	Total GBPEI Scores (A+B)
2009-10	222	205	427
2010-11	263	234	497
2011-12	261	281	542
2012-13	368	350	718
2013-14	421	382	803
2014-15	416	411	827
2015-16	467	473	940
2016-17	625	544	1169
2017-18	632	601	1233
2018-19	592	610	1202

Source: Compiled by the researcher

Figure 4.3: Annual Growth Rate of GBPEI across 10 years



Source: Compiled by the researcher

The total GBPEI scores of Private and Public Sector Banks are displayed in Table 4.18.
The annual growth rate has been steadily rising over the years. Only a negative growth
rate is seen in the year 2018-2019. As can be observed in Figure 4.3, there is a sharp
increase in Annual Growth rate of Green Banking Performance Evaluation Index in the

year 2012-2013. Another noticeable annual growth has been seen in the year 2016-2017. Also, the increase from 2014-2015 to 2015-2016 is also significantly high. Possible explanations for the significant increase in the annual growth rate can be attributed to the Securities Exchange Board of India (SEBI) regulation of Business Responsibility Report (BRR). The regulation was introduced in the year 2011-2012 and the banks were asked to disclose their environmental and social activities from 2012-2013 (the year in which a significant increase in the annual growth rate has been seen). Only the 100 best corporations based on market capitalization were subject to this regulation. From 2015-2016, 500 best corporations based on market capitalization were subject to this SEBI BRR regulation.

The fifth research question explores whether there any difference between the mean GBPEI scores of Phase 1, Phase 2 and Phase 3 of SEBI BRR regulation?’

The time period considered for analysis of this objective, includes 3 distinct phases. The first phase starts from 2009-2010 to 2011-2012 (3 year period) in which there was no regulation regarding disclosure of green / environment related information. The next phase is again a three year period starting from 2012-2013 to 2014-2015, in which the SEBI introduced the BRR regulation for best 100 corporations based on market capitalization. The best 100 companies were to include Business Responsibility Report (BRR) along with annual report. The last phase is a four year period starting from 2015-2016 to 2018-2019 wherein the BRR regulation has been made obligatory for the best 500 corporations based on market capitalization.

One-Way Anova is done to compare the performance of the banks over three distinct period of time. The first phase starts from 2009-2010 to 2011-2012 (SEBI BRR Implementation first phase); the second phase starts from 2012-2013 to 2014-2015 (SEBI BRR Implementation second phase); and the last group is 2015-2016 to 2018-2019 (SEBI BRR Implementation third phase). The following hypothesis tested is:

H_{1a}: The mean GBPEI scores of banks across the 3 phases are equal.

H_{1b}: The mean GBPEI scores of Banks across the 3 phases are not equal.

The results of the One-Way Anova test are displayed below:

Table 4.19: One-Way Anova of GBPEI in SEBI BRR Phases

Descriptives								
Phases	Number	Mean	Standard Deviation	Standard Error	95% Confidence Interval		Minimum Value	Maximum Value
					Lower Bound	Upper Bound		
Phase 1	40	12.21	7.51	1.18	9.80	14.61	1.66	40.00
Phase 2	40	19.56	14.21	2.24	15.01	24.10	5.33	52.33
Phase 3	40	28.66	13.75	2.17	24.26	33.05	10.00	64.00
Total	120	20.14	13.86	1.26	17.63	22.65	1.66	64.00
Homogeneity of Variances				Welch's Test: Equality of Means				
Statistic: Levene	df ₁	df ₂	Significance		Statistic	df ₁	df ₂	Significance
8.881	2	117	.000	Welch	22.84	2	70.81	.000

Source: Compiled by the researcher

Levene's test assumes that variances are equal or there is homogeneity of variances. The null hypothesis of Levene's test is that the variances are equal. P value (probability value) in Levene's statistic is 0.00; thus, the null hypothesis of equal variances stands rejected. Hence equal variances are not assumed. It can be observed in the standard deviation column that all the three phases had high standard deviation. It means the values in all the three phases are scattered from the mean. When compared, phase 1 has the minimum standard deviation and phase 2 has the maximum standard deviation. It means in Phase 2, the GBPEI scores are scattered widely from their mean value of 19.56. The reason behind the high deviation in phase 2 may be the SEBI BRR regulation. The regulation was implemented for the first time during that phase and it made some banks mandatorily adopt Green Banking practices, and few banks to opt for Green Banking practices at their wish. Also, high variation is seen in phase 3, the reason behind that may be the increase in scope of SEBI BRR regulation, which mandated a higher number of banks to abide by the regulation. This phase though brought more number of banks under its ambit but also kept several banks out of the mandatory clause. This perhaps widened the Green Banking Performance among the banks in India. When equal variances are not assumed, then the Welch's test is used in place of Anova (Frost, 2022). Sig Value (p value) in Welch's test is 0.00. Since the p value is lower than 0.05; hence the null hypothesis of equality of mean scores amongst the 3 phases is not accepted. The alternate hypothesis 'the mean GBPEI scores of Banks across the 3 periods are not equal' stands true. Since, there exist difference between the

mean scores; Post-Hoc analysis is done. The Game-Howell Post Hoc analysis is done and is illustrated below in Table 4.20.

Table 4.20:Post Hoc Analysis

(I) Phase of SEBI Regulation	(J) Phase of SEBI Regulation	Difference in Mean {I-J}	Standard Error	Significance	95% Confidence Interval	
					Lower Bound	Upper Bound
Phase 1	Phase 2	-7.34*	2.54	.015	-13.46	-1.23
	Phase 3	-16.44*	2.47	.000	-22.40	-10.49
Phase 2	Phase 1	7.34*	2.54	.015	1.23	13.46
	Phase 3	-9.09*	3.12	.013	-16.56	-1.62
Phase 3	Phase 1	16.44*	2.47	.000	10.49	22.40
	Phase 2	9.09*	3.12	.013	1.62	16.56

Source: Compiled by the researcher

The table above shows that the Sig Value (p value) is less than 0.05 in all the cases, which means the null hypothesis that the GBEI mean scores are equal across the three periods, is not accepted. In fact, the mean scores between all the phases differ. This is further validated from the table 4.19. A significant disparity in average scores between all three phases is seen in Table 4.19.

4.4 Performance Comparison between Public and Private Sector Banks

This section compares the Green performance of Private and Public Sector Banks. There are 21 Public Sector Banks and 19 Private Sector Banks. Three analyses are done to compare their performance. The very first analysis is to see the growth of their Green Performance over the 10 year period using a line diagram. The second analysis is done by preparing scorecards separately for Private Banks and Public Banks, and then preparing an overall scorecard with both the sectors' data. Third analysis done is to test if the average scores of GBPEI of Private and Public Sector Banks are same or dissimilar. Two-Sample t-test also known as Independent t-test is used for this analysis. This section addresses the following research questions:

RQ6. What is the trend of Green Banking Performance of Private and Public banks?

RQ7. Which sector scored better over the years?

RQ8. Which is the top performing and lowest performing bank in terms of Green Banking?

RQ9. Is there any difference between the mean GBPEI scores of Public and Private Sector banks?

The sixth research question is addressed two ways. First a line graph is used by plotting the total GBPEI scores over the 10 years. The total value of GBPEI of the Public Sector Banks and the Private Sector Banks are compared below in Figure 4.4 to see the trend of change over the years. Formulae used for calculating the values are:

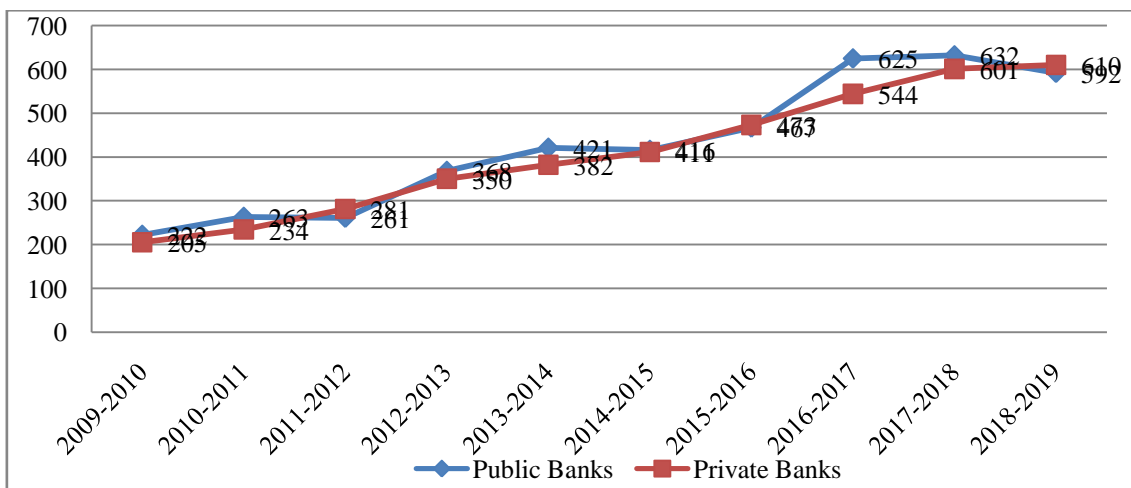
$$GBPEI_{PUB} = \sum_{i=1}^{21} GBPEI$$

Where, $GBPEI_{PUB}$ = Green Banking Performance Evaluation Index Score of Public Sector Banks for each year, i = Number of banks, $GBPEI$ = Green Banking Performance Evaluation Index Score for one bank for one year.

$$GBPEI_{PVT} = \sum_{i=1}^{19} GBPEI$$

Where, $GBPEI_{PVT}$ = Green Banking Performance Evaluation Index Score of Private Sector Banks for each year, i = Number of banks, $GBPEI$ = Green Banking Performance Evaluation Index Score for one bank for one year.

Figure 4.4: Comparison of Total Green Banking Performance Evaluation Score



Source: Compiled by researcher

It can be observed from above figure that the Public and Private Sector shows similar kind of growth of Green Banking Performance over the 10 year period. Only notable

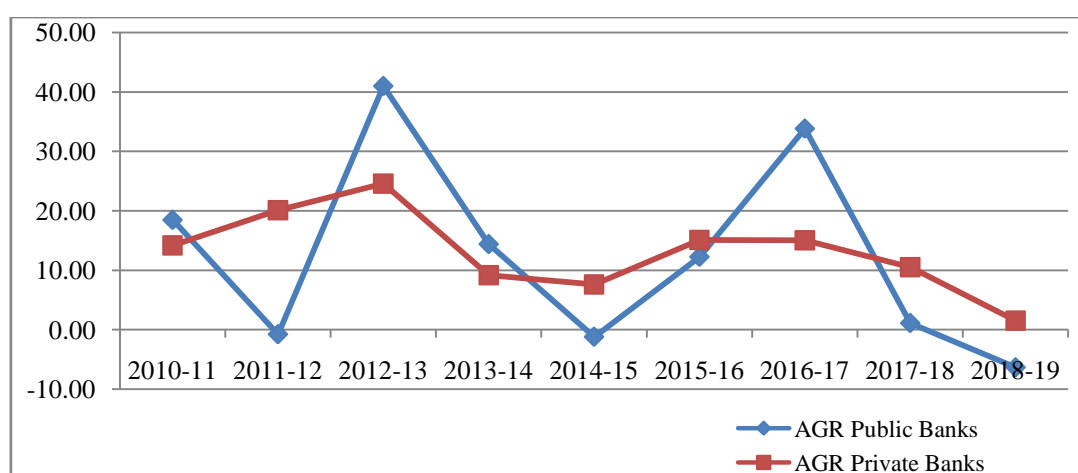
change is seen in the year 2016-2017 wherein the growth in the Public Sector has seen a significant rise compared to the Private Sector.

Secondly, the trend of Green Banking Performance of Public sector Banks and Private Sector Banks is compared using a line diagram. The formula used for calculating annual growth rate is:

$$AGR = \frac{N_{t+1} - N_t}{N_t} \times 100$$

Where, AGR = Annual Growth Rate; N_{t+1} = Green Banking Performance Evaluation Score in t + 1 years; N_t = Green Banking Performance Evaluation Score in t years

Figure 4.5: Annual Growth of Public Sector Banks and Private Sector Banks



Source: Compiled by the researcher

As can be seen, over the past ten years, the yearly growth rate in Public Sector Banks has experienced notable highs and lows. The sector experienced negative annual growth rate in 3 of the years, namely 2011-12, 2014-15 and 2018-19. And also, on the extreme end, it experienced significant positive growth rate in 2012-13 and 2016-17. The reason behind Public Sector Banks experiencing significant growth in those two years is because in 2012-13, more number of Public Sector Banks came under SEBI BRR mandatory clause for 100 companies, and in 2016-17, more number of Public Sector Banks came under SEBI BRR mandatory clause for 500 companies. However, as compared to Public Sector, Private Sector experienced moderate growth rate over the 10 years. In none of the years it experienced negative growth rate, and it had a quite steady positive annual growth rate over the years. However, a major drop in Private Sector Banks is noted in the year 2018-19. Thus, unlike the trend of clubbed

performance of Public sector banks and Private Sector Banks, which showed similar trend, the annual growth rate however depicted a different picture for both the sectors.

Next, an attempt is made to identify which sector amongst the two scored better over the years. It addresses the 7th research question in this analysis. To answer the question, year wise total scores of Private and Public Sector Banks are compared. Additionally, their overall mean scores are compared. The total and average scores of both the sectors are displayed below in Table 4.21.

Table 4.21: Total and Average GBPEI Scores

Years	Public Banks	Private Banks	Sector that Scored Better
2009-2010	222	205	Public
2010-2011	263	234	Public
2011-2012	261	281	Private
2012-2013	368	350	Public
2013-2014	421	382	Public
2014-2015	416	411	Public
2015-2016	467	473	Private
2016-2017	625	544	Public
2017-2018	632	601	Public
2018-2019	592	610	Private
Total Score	4267	4091	Public
Average Score	426.7	409.1	Public

Source: Compiled by the researcher

It can be concluded from Table 4.21 that of the ten years, in seven years Public Sector Banks have scored better. Only in 3 years Private Banks scored higher. Also, average score of Public Banks is better than Private Banks. Thus, the Public Sector scored better than Private Sector, when the total performance of both the sectors is compared.

The next analysis identifies the top performing and low performing banks in the domain of Green Banking. Banks are scored on the basis of information available in their reports. Scorecards for all the 40 banks are prepared. Cumulative score of each bank is used for assigning ranks to the banks. Two step analyses are done in this direction. Three scorecards are prepared. In the first scorecard (Table 4.22) the Public Sector Banks are compared and ranked within them. The second scorecard (Table 4.23) compares the Private Sector Banks amongst themselves. Last scorecard (Table 4.24) is prepared in which all the Private and Public Banks are taken together and ranked based

on their total scores. It addresses the 8th research question: Which is the top performer and lowest performer bank?

Table 4.22: Score Card for Public Sector Banks

Public Sector Banks	Total Scores	Rank
State Bank of India	403	1
Punjab National Bank	328	2
Bank of Baroda	318	3
Canara Bank	257	4
IDBI Bank	245	5
Union Bank	244	6
Indian Bank	238	7
Bank of India	237	8
Syndicate Bank	231	9
Corporation Bank	201	10
Andhra Bank	188	11
Oriental Bank of Commerce	177	12
UCO Bank	167	13
Central Bank of India	158	14
United Bank of India	151	15
Indian Overseas Bank	146	16
Bank of Maharashtra	136	17
Allahabad Bank	125	18
Vijaya Bank	124	19
Dena Bank	110	20
Punjab & Sind Bank	83	21
Total Score	4267	

Source: Compiled by the researcher

Amongst the Public Sector Banks, State Bank of India secured the first rank, followed by Punjab National Bank. Third rank is secured by Bank of Baroda. The last rank amongst the Public Sector Banks is secured by the Punjab and Sind Bank, followed by Dena Bank and Vijaya bank. The scorecard for the Private Sector Banks is tabulated below:

Table 4.23: Score Card for Private Sector Banks

Private Sector Banks	Scores	Rank
YES Bank	488	1
IndusInd Bank	486	2
HDFC Bank	429	3
Axis Bank	416	4
Kotak Mahindra Bank	311	5
ICICI Bank	308	6
Jammu & Kashmir Bank	186	7

South Indian Bank	176	8
Karur Vysya Bank	174	9
RBL Bank	173	10
Federal Bank	146	11
DCB Bank	125	12
Karnataka Bank	115	13
City Union Bank	114	14
Tamilnad Mercentile Bank	102	15
Catholic Syrian Bank	99	16
Dhanlaxmi Bank	90	17
Lakshmi Vilas Bank	82	18
Nainital Bank	71	19
Total Score	4091	

Source: Compiled by the researcher

Amongst the Private Sector Banks, YES Bank secured 1st rank. IndusInd Bank secured 2nd rank. 3rd rank is secured by HDFC Bank. The last rank amongst the Private Sector Banks is secured by Nainital Bank, followed by Lakshmi Vilas Bank. Dhanlaxmi Bank secured the 3rd last rank. The last scorecard including ranks of banks from both the sectors is tabulated below.

Table 4.24: Ranks of Public Sector and Private Sector Banks

Banks	Ranks	Banks	Ranks
YES Bank	1	Karur Vysya Bank	21
IndusInd Bank	2	RBL Bank	22
HDFC Bank	3	UCO Bank	23
Axis Bank	4	Central Bank of India	24
State Bank of India	5	United Bank of India	25
Punjab National Bank	6	Federal Bank	26
Bank of Baroda	7	Indian Overseas Bank	26
Kotak Mahindra Bank	8	Bank of Maharashtra	27
ICICI Bank	9	DCB Bank	28
Canara Bank	10	Allahabad Bank	28
IDBI Bank	11	Vijaya Bank	29
Union Bank	12	Karnataka Bank	30
Indian Bank	13	City Union Bank	31
Bank of India	14	Dena Bank	32
Syndicate Bank	15	Tamilnad Mercentile Bank	33
Corporation Bank	16	Catholic Syrian Bank	34
Andhra Bank	17	Dhanlaxmi Bank	35
Jammu & Kashmir Bank	18	Punjab & Sind Bank	36
Oriental Bank of Commerce	19	Lakshmi Vilas Bank	37
South Indian Bank	20	Nainital Bank	38

Source: Compiled by the researcher

Table 4.24 reflects Green Banking Performance of the sample 40 banks over the last 10 years (2009-2010 to 2018-2019). The main score card of the 40 banks reflects that the top three ranks are secured by Private Sector Banks (YES Bank, IndusInd Bank, and HDFC Bank). The last two ranks are also secured by Private Banks (Nainital Bank and Lakshmi Vilas Bank). The third last rank is secured by a Public Sector Bank (Punjab and Sind Bank).

The last analysis of this section attempts to see if any difference exists between the mean GBPEI scores of Private and Public Sector Banks. Independent t-test is used to find the existence of difference in mean. It addresses the 9th research question. The hypothesis tested for the same is:

H_{2a}: $\mu_1 = \mu_2$, where μ_1 = Public Sector Banks' average GBPEI scores, μ_2 = Private Sector Banks' Average GBPEI scores

H_{2b}: $\mu_1 \neq \mu_2$, where μ_1 = Public Sector Banks' average GBPEI scores, μ_2 = Private Sector Banks' Average GBPEI scores

The results of the Independent t-test are displayed in two tables below. The first table (Table 4.25) contains the group statistics of GBPEI.

Table 4.25: Group Statistics of GBPEI across Public and Private Sectors

	Nature of Banks	N	Mean	Std. Deviation	Standard Error Mean
Average Score	Public Sector Bank	21	20.4424	7.88283	1.72018
	Private Sector Bank	19	21.5316	14.35994	3.29440

Source: Compiled by the researcher

In Table 4.25, N represents the number of Public Sector Banks and Private Sector Banks. Mean of Public Sector Banks is 20.44, which is not much different from the mean of Private Sector Banks which is 21.53. This is further tested with the help of t-test and the results are displayed below in Table 4.26.

Table 4.26: Independent t-test of Public Banks and Private Banks

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F value	Significance	t value	Degree of freedom	Sig. (2-tailed)	Mean Difference	Standard Error Difference	95% Confidence Interval	
									Lower	Upper
Average Score	Equal variances assumed	9.29	.00	-.30	38	.76	-1.08	3.61	-8.40	6.22
	Equal variances not assumed			-.29	27.32	.77	-1.08	3.71	-8.71	6.53

Source: Compiled by the researcher

The null hypothesis for the Levene's test is that equal variances are assumed. However, the Sig value (p value) is 0.004 which is less than 0.05. Hence, the null hypothesis of Levene's Test is not accepted. The alternate hypothesis that equal variances are not assumed is accepted. This is further supported by the standard deviation value in Table 4.25. The standard deviation is higher in Private Sector as compared to the Public Sector. It means GBPEI score is highly scattered from the mean in case of Private Sector. It is thus because of this that Private Sector are the best performers and the weakest performers in Green Banking across the sectors. The p value for the Independent t-test is 0.772 which is greater than 0.05, thus we do not reject null hypothesis. Therefore,

H_{2a} : $U_1 = U_2$, where U_1 = Average mean scores of Public Sector Banks, U_2 = Average mean scores of Private Sector Banks, stands true.

4.5 Chapter Summary

The analysis of objective 1 framed in the Review of Literature chapter is discussed in this chapter. The chapter discusses the Green Banking practices and concludes that the most popular Green Banking practices of Indian banks are those which they adopt in their daily operations like electronic and digital technologies, green infrastructure and

optimum utilization of resources and renewable energy. The chapter analyzes the performance of Indian banks with regards to their Green activities.

In this chapter, the Green Banking Performance Evaluation Score (GBPES) is calculated for each of the bank for each year. Thus, the highest scorer and the lowest scorer banks in each of the years are presented under Table 4.16. The annual growth of GBEPS is highest in 2012-13 and in 2016-2017. The SEBI' introduction of the regulation on Business Responsibility Report is the possible explanation for the increase in GBPES in those years. One-Way Anova confirms that there is major difference in mean scores of GBPEI between the three phases of SEBI BRR regulation, namely 2009-2010 to 2011-2012 (SEBI BRR Implementation 1st phase); 2012-2013 to 2014-2015 (SEBI BRR Implementation second phase); and 2015-2016 to 2018-2019 (SEBI BRR Implementation third phase).

Also, Green Banking Performance of Public and Private Sector Banks are compared using scorecards. Out of 10 years under consideration, Public Banks outperformed the Private Banks in 7 of the years. Among the Public Banks, State Bank of India is the top performer and among Private Sector Banks, Axis Bank is the top performer. When Public and Private Banks are compared for their performance in the last 10 years, then YES Bank topped the list and Nainital Bank got the last rank. The Independent Sample t-test conducted at the end shows that there lies no significant difference among the Green Banking Performance Evaluation Score of Public and Private Banks.