



Footprints of Green Banking Operations on the Environmental Performance

Taqween Ahmed^{a*}, Dr. Muhammad Naeem^b

^aMS Finance, Department of Economics and Finance Foundation University Islamabad, Pakistan. ^bDepartment of Economics and Finance Foundation University Islamabad, Pakistan

*Email: taqweenahmed@gmail.com

Abstract: The main objective of this research paper is to determine how green banking operations affect environmental performance of banks. It will also identify the mediating role that green finance sources play in the relationship between green banking operations and environmental performance, and the moderation of responsible leadership on the green banking operations and green finance sources of both Islamic and conventional banks in Pakistan. A sample size of 132 was recorded after the convenience sampling technique was utilized to gather primary data from bankers. Structural Equation Modelling was used to evaluate the connection between the study variables. The findings suggest that green banking practices greatly improve banks' environmental performance and sources of green financing also have a significant impact on banks' environmental performance. The results also indicate a strong positive effect of responsible leadership on the relationship of green banking operations and green finance sources. Only a few studies have been published to demonstrate green banking and merely any study explained mediation relationship. Consequently, a comprehensive analysis and exploration of the problem is required especially in context of Islamic Banks of Pakistan. Another distinctive feature is that also incorporates the moderation of responsible leadership in this connection.

Keywords- Responsible leadership, green banking, legitimacy theory, ecologically responsible, environmental performance.

1. Introduction

Climate catastrophes including earthquakes, droughts, storms, heat waves tsunamis and floods affect the entire planet. Since these climate changes jeopardize the sustainable way of life on Earth, all developed and developing nations must act immediately and proactively (Hopwood et al., 2005). Pakistan, which is ranked 18th of 191 nations in the Inform Risk Index 2019, has some of the greatest levels of disaster risk in the whole globe. The country's dangers from internal political conflicts and its vulnerability to earthquakes are the main factors driving this risk. However, Pakistan is also strongly exposed to coastal flooding and riverine. In addition, there is some vulnerability to tropical cyclones and the dangers they pose as well as to drought. Pakistan's socio and economic fragility is a major factor in the country's disaster risk. High percentages of various forms of poverty in Pakistan account for its vulnerability ranking of 37 out of 191. The United Nations Environmental Program (UNEP) defines the "green economy" as economic activities that raise social welfare and well-being while also significantly reducing ecological scarcities. In order to secure a green economy and, consequently, sustainability, lowering energy consumption and emissions through green financing is a crucial option and path for economic growth in developing countries. A green economy is one that is fair, low in carbon emissions, and environmentally sound, to put it simply.

The term "green banking" (GB), often referred to as ethical, social, and sustainable banking, in both academic and professional contexts. According to some scholars, it is a vital tool for a nation's sustainable economic

development through ecological protection (Wang & Zhi, 2016; Zhang & Managi, 2019; Zhou et al., 2020). As per Bihari and Pradhan (2011), green banking operations encourage a green environment by lowering CO2 footprints, which in turn facilitate businesses to choose clean energy innovations. Because the banking sector is one of the main providers of capital to many firms and industries, banks are subjected to a high standard of responsibility. Green banking practices can develop a competitive edge in terms of boosting corporate, environmental, and social benefits and customer loyalty (Nath et al., 2014). Green banking operations refers to how the bank implements a green environment in its day-to-day operations, such as reducing its paper use, setting up energy efficient building, use of e-mails, e-statements and online approval systems etc. Rehman et. al (2020) suggested that with its extensive branch networks and automated teller machines, the banking industry consumes the most resources, including paper and power (ATMs). Yet, the utilization of digital banking technologies and internal greenhouse initiatives that support them can help minimize the negative environmental impact to a larger extent.

Several studies on green banking practices have been conducted in recent years. In some studies, the benefits and constraints of green financing were analyzed globally (Fedorova, 2020; Kala & Vidyakala, 2020; Zaidi et al., 2019; Zheng et al., 2021). The studies conducted in Pakistan analyzed green finance for its relationship with sustainability, and only secondary data assessment was done for commercial banks (Islam, 2018; Mumtaz & Smith, 2019; Rehman et al., 2021). However, relatively few studies have been published that demonstrate how GB activities affect environmental and social performance of banks through the bridging function of green funding in developing nations like Pakistan. Consequently, a comprehensive analysis and exploration of the problem is required especially in context of Islamic Banks of Pakistan. Another important feature of this study is that it also incorporates the moderation of responsible leadership while studying the relationship of green financing operations and green financing sources.

2. Theoretical Framework

According to legitimacy theory, social approval is crucial to ensuring a business's long-term sustainability. It is widely acknowledged that legitimacy theory explains the trend of firms making non-mandatory environmental and social disclosures. According to the concept of legitimacy theory, companies use social and environmental reporting methods to improve, maintain, or regain their legitimacy (Mousa & Hassan, 2015). To achieve financial sustainability by carrying out a variety of distinct actions, such as CSR and green banking operations, as it helps companies to achieve the nation's prolonged progress, businesses must decide on procedures that are appropriate and in line with societal norms, principles, and customs. The responsible leader plays a key role in developing and managing the interaction of various levels of social capital, in enabling social capital, and in maintaining it because they are at the center of a network of stakeholders. This central position allows them to shape an organization's relationships with both internal and external stakeholders. The moderating role of the responsible leader is thus backed up by the stakeholder theory.

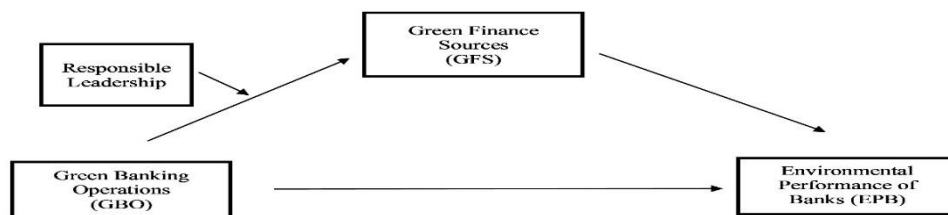


Figure 1: Theoretical Framework for model

In light of the discussions above, the following are important research considerations: green banking activities as a predictor variable, green funding sources as an intervening role, responsible leadership as a moderator variable and EPBs as an outcome variable.

- H1: Green banking operations have positive influence on environmental performance of banks.
- H2: Green Finance Sources have a positive influence on the environmental performance of banks.
- H3: The green finance sources of banks are significantly impacted by the green banking activities
- H4: The sources of green finance play a substantial intervening role between Green Banking operations and EPBs.
- H5: Responsible leadership act as a moderator between green banking operations and green financing sources.

Banks have been the providers of finance for all types of businesses but if a bank finances enterprises and industries that damage the environment, it will exacerbate the state of the ecosystem, which will increase health complications (Nizam et al, 2019). In the last decade, there has been a lot of emphasis on improving the deteriorating environmental conditions. Akomea-Frimpong (2022) states that banks' role should be to facilitate finance and do investments that are ecologically responsible. Therefore, the sources through which green finance activities are conducted can influence environmental performance, and an analysis is needed to explain it. But in order to functionalize it, leadership plays a critical role, i.e., if the top management in banks takes the initiative to encourage spending on ecologically sound technologies and enforce socially acceptable strategies throughout their working environment, then the perceived environmental performance of banks can be enhanced. Thus, the analysis of green banking activities of the bank, its green finance sources and role of responsible leadership to assess the environmental performance of the banks is vital.

The Dutch bank known as "Triodos Bank" was the first to put the concept of "green banking" into practice. The bank also established a "Green Fund" campaign for the environment, which later turned out to be an example for banks in exploration of green banking operations in 1990. Nevertheless, with the International Finance Corporation's (IFC) initiative and the creation of the Sustainable Banking Network (SBN) to support this banking in emerging economies, the implementation of such green banking practices especially in developing countries, garnered considerable notoriety in 2012.

The first issuance of green banking guidelines in Pakistan were in 2017. Additionally, it has incorporated finance for renewable energy in both traditional and Shariah-compliant sources. In terms of neighboring and other nations, Banks in Pakistan lag far behind in terms of green banking initiatives. For instance, the U.S. green banking act was introduced in 2009 to promote green banking. In a similar vein, in 2011 the central bank of Bangladesh established green banking standards (Bangladesh Bank, 2011). In the same year, the ministry of environmental protection China introduced a green credit scheme (Aizawa, 2010). Malaysia also has a government-regulated green technology finance program (Chua & Oh, 2011).

"Green finance" is a term used to describe a contemporary financial phenomenon that combines environmental development with social and economic benefits. Green finance, which has social responsibility and environmental protection at its essence, is a growing phenomenon that is a stimulant for sustainable economic growth (Berrou et al., 2019; Liu et al., 2020; Mumtaz & Smith, 2019; Wang & Zhi, 2016). Additionally, through green funding activities, banks can reduce their internal and external carbon footprints (Zhang et al., 2022). As suggested by the European Commission, in order to assure consumer and societal satisfaction, green financing in financial services consists of investment choices that take social, environmental, and governance factors into account. Therefore, green finance is defined as the funding of environmentally sound projects, including efficient, and alternative energy products, waste management, and green industry development projects, to attain sustainability (Zheng et al., 2021). Yadav and Pathak (2013) while comparing banks in the public and private sectors, seeks to categorize the stages of banks' marketing practices based on their green banking campaigns. It found that the majority of banks are pursuing initiatives that are good for both the environment and companies.

Environmental performance incorporates, among other things, the use of environmentally sound materials in product manufacturing, the reduction of waste and pollution at its origin, advances in energy conservation and resource utilization, and the exclusion of substances that are dangerous for the environment. The effect of a corporation's activities on the external environment is referred to as environmental performance (Klassen & Whybark, 1999). According to Shaumya and Arulrajah (2017) it is crucial to emphasize that environmental performance refers to corporate environmentalism, which entails the efficient management of activities to meet clearly defined long-term targets for conservation of both natural resources corporate yield. Another research suggests that Company's environmental performance describes sustainability goals that corporations set in order to satisfy stakeholders like as shareholders, creditors, employees, customers, suppliers, and the community as well as to adhere to legal and regulatory obligations and environmentally conscious business practices can give them a competitive edge (Karagozoglu & Lindell, 2000).

The funding of green initiatives to guarantee environmental sustainability supports green banking activities both at the corporate and policy levels. Therefore, Shaumya and Arulrajah (2017) explained green banking practices enhance environmental performance of banks by reducing activities that have an adverse impact on the external environment, such as fuel consumption, carbon emissions, and paper use, and by promoting activities that have an advantage over the environment, such as improving staff environmental awareness and

experience in leveraging greenery while using solar and wind power. Also, Li et al. (2020) affirmed that green finance, which emphasizes social responsibility and environmental preservation, has its socioeconomic rewards and offers a new catalyst for sustainable financial development.

Leadership that is believed to be competent and justly fulfils roles, norms, ethics, and moral commitments to specific stakeholders while also being willing to accept responsibility for the results of their actions and behaviors is referred to as responsible leadership. It is believed that a responsible leader will encourage a path for communication among stakeholders and a representative who maintains an equilibrium between the requirements of the numerous stakeholders both inside and outside the business (Voegtlin, 2011). Building relationships is a principal concern of responsible leadership, and it primarily entails the development of interpersonal connections, transparent communication, the adoption of prosocial behavior, and the spread of positive contribution. Siegel (2014) claimed that the senior managers have the power to create and enforce socially acceptable strategies. Therefore, responsible leadership influences the means by which green activities can be conducted.

Research by Rehman et al. (2021) used the Socially Responsible Investment (SRI) theory to examine the relationship between GB operations and their effects on EPBs. The results show that policy-related activities, routine business processes, and green finance activities of Islamic banks in Pakistan have a significant positive association. Zheng et al. (2021) defined the four main categories of green funding focusing on the perception of bankers and evaluated the contribution of Private Commercial Banks to the growth of green finance in Bangladesh. Money invested in waste management, environmentally sound businesses, recycled green bricks, and recyclable goods are some of the sources, all of which are vital for a nation's long-term economic progress and the ecological rehabilitation of banks. Using data from the years 2008 to 2017, Jan et al. (2019) examined the sustainability of the Islamic banking. Their findings showed substantial beneficial relationship between sustainable activities and the monetary performance indicators of Islamic banks and also shareholders' perceptions. However, they discovered negligible financial results from a market perspective. In a similar vein, Hummel et al. (2020) did study using samples from 50 European banks and confirmed that only management concerns have a positive relationship with environmental performance and sustainability, but not risk management procedures. According to Bukhari et al. (2020), the banking industry has begun implementing green practices because of their potential negative impact on the destruction of the natural ecosystem and the depletion of natural resources. They also noted that many banking activities could be harmful to the environment, having both indirect and direct consequences. Their research tracks Pakistan's banking sector's transition to green banking. They underlined that underdeveloped economies needed to adopt green banking more than developed ones. Therefore, it is possible to conclude that GB aids in the social, economic, and environmental growth of a nation. However, the lack of customer awareness of GB, elevated investment expenditures, technicalities, a lack of qualified staff to appraise green credits, the complexity and difficulty of evaluating green investment forecasts and challenges with segmentation make the growth of GB in an evolving country like Pakistan is inadequate.

3. Research Methodology

The aim of this research is to determine how GBO increase EPBs. On one hand, it will explain the role that green finance sources play in intervening between this relationship, while on the other hand, it will explain the moderation of responsible leadership in between the green finance sources and green finance operations. A structured questionnaire method and convenience sampling technique was used to collect primary data from the bank officials of both Conventional and Islamic banks in Pakistan in order to meet the aim. A non-probability sampling technique called convenience sampling includes taking a sample as per convenience, such as convenience of access, availability at a given time, or desire to participate in the study. Zheng et al. (2021) stated that the method of convenience sampling was a workable substitute because it was less expensive and easier to get the necessary replies. Therefore, a sample size of 132 respondents was collected from commercial and Islamic banks, amongst which 27% respondents were female and 73% were male. The development of the Green Banking activities was based on research into the body of Green Banking literature, which identifies the variables impacting Environmental performance of Banks (EPB) and the green finance sources (intervening variable) and RL (Responsible Leadership) as a moderator. The questionnaire consists of twenty items to calculate two research variables (GBO and EPB), one mediator (GFS) and one moderator (RL). All the questionnaire items are listed in appendix provided and were created using the available Green Banking

literature. For instance, seven items were used to evaluate Green Banking Operations were taken from the study by (Rehman et al., 2021), three for the GFS were taken from the research by (Zhang et al., 2022), five for the EPB is taken from the study by (Shaumya and Arulrajah, 2017) and five for RL are taken from study by (Voegtlin, 2011). Thus, the twenty questionnaire items are taken from existing literature and shown in Appendix A.

4. Data Analysis

Statistical Package for Social Sciences (SPSS) 22.0 was used to evaluate the primary data. The research hypotheses employed in this study was tested using the SEM technique. Internal reliability of the research components was investigated using Cronbach's alpha ratings.

The descriptive statistics show that means range from 3.3258 to 3.5682, indicating a central tendency towards the higher end of the scale. Standard deviations are less than 1 for all variables, suggesting relatively low variability in responses. Cronbach's Alpha values are reported for Green Financing (0.900 with 7 items), Environmental Performance (0.941 with 5 items), and Responsible Leadership (0.949 with 5 items), indicating high reliability for these scales as shown in Table I.

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

	N	Range	Min	Max	Mean	SD	CA (α)
GB	132	4	1	5	3.568	0.827	
GF	132	4	1	5	3.326	0.931	0.900
EP	132	4	1	5	3.520	0.983	0.941
RL	132	4	1	5	3.480	0.928	0.949

Pearson correlation coefficients among the four variables are significant at the 0.01 level (2-tailed), with coefficients ranging from 0.805 to 0.896, indicating strong positive relationships between the variables and also shown in the Table II below.

4.2 Correlation Analysis

Table 2: Correlations

	GB	GF	EP
GF	.836**		
EP	.879**	.870**	
RL	.846**	.805**	.896**

The results for the model run in SPSS are shared in appendix B, which shows the relationship amongst the variables as per Hayes Model 7, shown in Table III. The results show that there is a significant relationship among all the variables, the t- values and p- values for assessing the GBO and EP relationship presents significance results. There's also a section on indirect effects, highlighting the mediation effect of GF between GB and EP, with varying levels of RL. The confidence level for all intervals is 95%. Overall, the result provides a comprehensive statistical analysis, focusing on the relationships between variables related to green banking, financing, environmental performance, and leadership. The value of $p < 0.05$, indicating a strong relationship amongst the variables, therefore we reject the null hypothesis i.e. there is no relationship amongst the variables. Thus, we can conclude that we have enough evidence to support our alternative hypothesis, green banking operations have positive influence on environmental performance of banks, green finance sources have a positive influence on the environmental performance of Islamic banks, the environmental performance of banks is significantly impacted by the use of green finance sources, the sources of green

finance play a substantial intervening role between Green Banking operations and EPBs and lastly, responsible leadership act as a moderator between green banking operations and green financing sources.

4.3 Hypothesis Testing

Table 3: Test of research Hypothesis

Hypothesis	Path	S.E	t- value	p-value	Decision
H1	GBO → EP	0.0779	7.6629	0.0000	Accepted
H2	GFS → EP	0.0691	6.8853	0.0000	Accepted
H3	GBO → GFS	0.1759	3.6270	0.0004	Accepted
H4	GBO → GFS → EP	0.0779	7.6629	0.0000	Mediation
H5	RL	0.1806	2.0455	0.0429	Moderation
	↓ GBO → GFS				

Significant at $p < 0.05$.

4.4 Discussion, Recommendation and Conclusion

This research has academic value on its own since it will add value to the literature. In order to fill the empirical gap in the existing knowledge and to provide a rich updated literature platform for future research, this study investigates the green banking practices in the chosen Pakistani banks. This study is particularly concerned with Pakistan and the need to investigate and explore this emerging phenomenon. Researchers and academicians in Pakistan can use the study's findings for future research purposes, especially when keeping in mind green banking activities, green banking sources, the environmental performance of banks, and the role of responsible leadership in its perspective. Bank managers and financial institutions in Pakistan can use the study's findings to increase their banks' environmental efficacy and profitability. Bank officials may concentrate more on the growth of GBO (Green Banking Operations) in their daily activities by offering digital banking services such as online bill payment, mobile banking, remote deposit, green credit and debit cards, etc. Therefore, banking establishments should enhance their spending on ecologically responsible initiatives, including waste management, renewable fuels, alternative resources, green industrialization, and energy conservation schemes, in order to improve their environmental performance. This, in turn, will contribute to the country's Sustainable Development Goals.

Researchers, scholars, and professionals have shown considerably more interest in the subject of green finance and GB in both developed and developing nations during the past 20 years. Thus, the purpose of this research was to study how green banking activities affect banks' environmental performance and moderation of responsible leadership between green banking operations and sources of green finance as well as how green financing modifies the relationship between GB activities and banks' environmental performance. The result suggests a strong positive correlation between GB activities and banks' environmental performance, indicating that Hypothesis 1 is valid and it is also backed up by the past literature (Shaumya and Arulrajah, 2017; Kala & Vidyakala, 2020; Zheng et al., 2021). Thus, it is possible to conclude that GB initiatives boost Pakistan's efforts to enhance banks' environmental performance. The findings support Hypothesis 2, which suggests a substantial positive correlation between green finance and banks' EP. This result is in line with the findings from the study by Kala & Vidyakala, 2020). Consequently, it can be established that green finance aids to the improvement of banks' environmental performance by funding a broad range of environmentally friendly initiatives, including waste management, recycling and recyclables, renewable energy, energy conservation, and other environmentally friendly projects.

Hypothesis 3 was validated by empirical evidence that showed GB activities have significant beneficial effects on bank green financing in Pakistan and it was also supported by the research done by (Rehman et al., 2021). This suggests that GB initiatives are vital to Pakistan's green finance industry's expansion and development since they contribute to the nation's efforts to attain sustainable growth and lessen environmental degradation. The results of this study confirm that the relationship between GB activities and banks' environmental performance has been considerably mediated by green finance in Pakistan. A similar study supports our

Hypothesis 4 with respect to data from Bangladesh private commercial banks Zhang et al. (2022).

This study contributes towards the present literature by examining the role of responsible leadership as a moderator between green banking operations and green financing sources and the results confirm our Hypothesis 5. In the presence of a responsible leadership influences the means by which green activities can be conducted. Furthermore, the results of the descriptive statistics demonstrated that the main advantages of GB are thought to be a strengthening of customer goodwill, the decrease in environmental pollutants from banking activities, the provision of online banking facilities, the decline of long-term expenditures and costs, and the increase in bank ability to compete. It is recommended that financial authorities take the necessary actions to cope with climate change challenges and accomplish the SDGs in order to fully profit from GB.

References

- Aizawa, M., & Yang, C. (2010). Green credit, green stimulus, green revolution? China's mobilization of banks for environmental cleanup. *The Journal of Environment Development*, 19(2), 119–144.
- Akomea-Frimpong, I., Adeabah, D., Ofori, D., & Tenakwah, E. J. (2022). A review of studies on green finance of banks, research gaps and future directions. *Journal of Sustainable Finance & Investment*, 12(4), 1241–1264.
- Berrou, R., Ciampoli, N., & Marini, V. (2019). Defining green finance: Existing standards and main challenges. *The Rise of Green Finance in Europe*, 31–51. https://doi.org/10.1007/978-3-030-22510-0_2
- Bihari, S. C., & Pradhan, S. J. J. (2011). CSR and performance: The story of banks in India. *Journal of Transnational Management*, 16(1), 20–35. <https://doi.org/10.1080/15475778.2011.549807>
- Bukhari, S.A.A., Hashim, F., Amran, A.B., & Hyder, K. (2019). Green Banking and Islam: Two Sides of the Same Coin. *Journal of Islamic Marketing*, 11(4), 977–1000. <https://doi.org/10.1108/JIMA-09-2018-0154>
- Chua, S. C., & Oh, T. H. (2011). Green progress and prospect in Malaysia. *Renewable and Sustainable Energy Reviews*, 15(6), 2850–2861. <https://doi.org/10.1016/j.rser.2011.03.008>
- Fedorova, E.P (2020). Role of the State in the Resolution of Green Finance Development Issues. *Financial Journal*, 12(4), 37–51.
- Hopwood, B., Mellor, M., & O'Brien, G. (2005). Sustainable Development: Mapping Different Approaches. *Sustainable Development*, 13, 38–52. <https://doi.org/10.1002/sd.244>
- Hummel, K., Laun, U., & Krauss, A. (2021). Management of environmental and social risks and topics in the banking sector-An empirical investigation. *The British Accounting Review*, 53(1), 100921. <https://doi.org/10.1016/j.bar.2020.100921>
- Jan, A., Marimuthu, M., bin Mohd, M. P., & Isa, M. (2019). The nexus of sustainability practices and financial performance: From the perspective of Islamic banking. *Journal of Cleaner Production*, 228, 703–717. <https://doi.org/10.1016/j.jclepro.2019.04.208>
- Kala, K.N., & Vidyakala (2020). K. A Study on The Impact of Green Banking Practices on Bank's Environmental Performance with Special Reference to Coimbatore City. *African Journal of Business and Economic Research*. 15(3), 1–6.
- Karagozoglu, N., & Lindell, M. (2000). Environmental management: testing the win-win model. *Journal of Environmental Planning and Management*, 43(6), 817–829.
- Klassen, R.D., & Whybark, D.C. (1999). The impact of environmental technologies on manufacturing performance. *Academy of Management Journal*, 42(6), 599–615.
- Li, S., Liu, X. & Wang, C. (2020). The influence of internet finance on the sustainable development of the financial ecosystem in China. *Sustainability*, 12(6), 2365.
- Mousa, G., & Hassan, N. T. (2015). Legitimacy theory and environmental practices: short notes. *International Journal of Business and Statistical Analysis*, 2(01), 41–53.
- Mumtaz, M. Z., & Smith, Z. A. (2019). Green finance for sustainable development in Pakistan. *Islamabad Policy Research Institute Journal*, 2, 1–34. <http://doi.org/10.31945/iprij.190201>
- Nath, B., Chaudhuri, P., & Birch, G. (2014). Assessment of biotic response to heavy metal contamination in

Avicennia marina mangrove ecosystems in Sydney Estuary Australia. *Ecotoxicology Environmental Safety*, 107, 284–29 <https://doi.org/10.1016/j.ecoenv.2014.06.019>

Nizam, E., Ng, A., Dewandaru, G., Nagayev, R., & Nkoba, M. A. (2019). The impact of social and environmental sustainability on financial performance: A global analysis of the banking sector. *Journal of Multinational Financial Management*, 49, 35–53.

Rehman, A., Ullah, I., Afridi, F.-A., Ullah, Z., Zeeshan, M., Hussain, A., & Rahman, H.U. (2021). Adoption of green banking practices and environmental performance in Pakistan: A demonstration of structural equation modelling. *Environment, Development and Sustainability*, 23, 13200–13220. <https://doi.org/10.1007/s10668-020-01206-x>

Shaumya, S.& Arulrajah, A. (2017). The Impact of Green Banking Practices on Bank’s Environmental Performance: Evidence from Sri Lanka. *Journal of Finance and Bank Management*, 5, 77–90.

Siegel, D. S. (2014). Responsible Leadership. *Academy of Management Perspectives*, 28(3), 221–223.

Voegtlin, C. (2011). Development of a scale measuring discursive responsible leadership. *In Responsible leadership*, 98, 57–73.

Wang, Y., & Zhi, Q. (2016). The Role of Green Finance in Environmental Protection: Two Aspects of Market Mechanism and Policies. *Energy Procedia*, 104, 311–316. <https://doi.org/10.1016/j.egypro.2016.12.053>

Yadav, R., & Pathak, G. (2013). Environmental Sustainability through Green Banking: A Study on Private and Public Sector Banks in India. *OIDA International Journal of Sustainable Development*, 6(8), 37–48.

Zaidi, S.A.H, Zafar, M.W., & Muhammad Shahbaz. M, & Hou, F (2019). Dynamic linkages between globalization, financial development, and carbon emissions: Evidence from Asia Pacific Economic Cooperation countries. *Journal of Cleaner Production*, 228, 533-543. <https://doi.org/10.1016/j.jclepro.2019.04.210>

Zhang, D., Zhang, Z., & Managi, S. (2019). A bibliometric analysis on green finance: Current status, development, and future directions. *Finance Research Letters*, 29, 425–430. <https://doi.org/10.1016/j.frl.2019.02.003>

Zhang, X., Wang, Z., Zhong, X., Yang, S., & Siddik A.B. (2022). Do Green Banking Activities Improve the Banks’ Environmental Performance? The Mediating Effect of Green Financing. *Sustainability*, 14(2), 989. <https://doi.org/10.3390/su14020989>

Zheng, G., Siddik, A.B., Masukujjaman, M., & Fatema, N. (2021). Factors Affecting the Sustainability Performance of Financial Institutions in Bangladesh: The Role of Green Finance. *Sustainability*. 13, 10165.

Zhou, X., Tang, X., & Zhang, R. (2020). Impact of green finance on economic development and environmental quality: A study based on provincial panel data from China. *Environmental Science and Pollution Research*. 27, 19915–19932 <https://doi.org/10.1007/s11356-020-08383-2>

Appendix A Questionnaire

Item	Description
Green banking operations (GBO)	
GBO 1	My bank has introduced energy-efficient equipment’s, system solutions and practices.
GBO 2	My bank has environment friendly banking practices (e-mail, intranet, e-statements, online approval system, and etc.).
GBO 3	My bank uses e-waste management practices.
GBO 4	My bank regularly arranges seminars workshop to promote environment friendly practices in daily operations
GBO 5	My bank involves in setting up green branches (energy efficient buildings/green buildings)
GBO 6	My bank has initiatives to reduce paper usage and other wastage of materials.

GBO 7 My bank encourages customers to use environment friendly banking practices (e-statements, online transfer etc.

Green financing sources (GFS)

GFS 1 My bank has invested more on renewable energy sectors.

GFS 2 My bank has invested more on energy efficiency projects.

GFS 3 My bank has invested more on recycling and recyclable products

GFS 4 My bank has invested more on waste management and other eco-friendly projects.

Environmental performance of banks (EPB)

EPB 1 My bank has environmental (green) performance evaluation practices

EPB 2 My bank has environmental-related agreements with relevant parties/ stakeholders (suppliers, customers, and etc.)

EPB 3 My bank promotes an environment friendly policy at corporate level

EPB 4 My bank provides training and education to the staff on environmental protection, energy and paper savings.

EPB 5 In my bank, head office level or top management involves in environmental protection related policies

Responsible Leadership (RL)

RL 1 The bank manager demonstrates awareness of the relevant stakeholder claims

RL 2 The bank manager considers the consequences of decisions for the affected stakeholder

RL 3 The bank manager involves the affected stakeholders in the decision-making process

RL 4 The bank manager weighs different stakeholder claims before making a decision

RL 5 The bank manager tries to achieve a consensus among the affected stakeholders
