*sustainability*

MDPI

*Article*

# Factors Affecting the Sustainability Performance of Financial Institutions in Bangladesh: The Role of Green Finance

**Guang-Wen Zheng [1], Abu Bakkar Siddik [1,*], Mohammad Masukujjaman [2] and Nazneen Fatema [3]**

[1] School of Economics and Management, Shaanxi University of Science and Technology (SUST), Weiyang University Park, Weiyang District, Xi'an 710021, Shaanxi, China; zhengguangwen@sust.edu.cn
[2] Department of Business Administration, Northern University Bangladesh, Dhaka 1213, Bangladesh; masukujjaman@nub.ac.bd
[3] Department of Economics and Banking, International Islamic University Chittagong (IIUC), Chittagong 4203, Bangladesh; nazneen.fatema@iiuc.ac.bd
* Correspondence: ls190309@sust.edu.cn; Tel.: +86-15686012117

**Abstract:** Despite the increasing popularity of green finance and sustainable investment in the field of Sustainable Development Goals (SDGs), very few studies have investigated the effect of green finance dimensions on the sustainable performance of banks. Therefore, this study attempts to examine the dimensions of green finance and their effects on the sustainability performance of financial institutions in developing economies such as Bangladesh. The study also depicts the level of green financing adoption among the banks and non-bank financial institutions in the country between 2015 and 2020. Considering the nature of the dataset, the structural equation modeling technique was employed in this study to fulfil the research objectives. Amongst banks and non-bank financial institutions, the study highlighted private commercial banks as being the highest contributor to green financing, accounting for 78.12% of the total green financing in Bangladesh. In addition, the empirical findings revealed that the dimensions of green finance are related to the economic, social, and environmental aspects of the SDGs. Furthermore, empirical findings indicated that the dimensions of green finance—social, economic, and environmental—have a strong positive effect on the sustainability performance of banks. The study also discovered that approximately 95% of bankers identify green financing as an essential element in the short- and long-term development of banking strategies in Bangladesh. Consequently, this study adds to the body of knowledge on green finance development and the sustainability performance of banks and financial institutions in emerging economies such as Bangladesh. Therefore, major managerial policy implications are discussed.

**Keywords:** green finance; sustainability performance; banking; SEM; Bangladesh



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

https://doi.org/10.3390/su131810165

Academic Editor: Kwangwoo Park

Received: 22 July 2021
Accepted: 8 September 2021
Published: 10 September 2021



## 1. Introduction

In recent years, most countries, particularly in the developing world, are focusing on economic expansion, while downplaying ecological improvement. Consequently, different environmental problems such as air pollution, climate change, land loss, biodiversity loss, deforestation, environmental damage, etc., have emerged [1,2]. Recently, the international agreement on environmental preservation, action against climate change awareness, and the United Nations' advocacy for SDGs by the year 2030 [3] have collectively heightened the interest in green finance [4,5]. The implementation of an effective green economy through green finance is a significant outlet for economic growth and sustainability in underdeveloped nations [6,7]. Therefore, to ensure sustainable and uniform development, the consciousness of environmental issues should be invoked among academics, bankers, investors, administrations, legislators, advocacy groups, corporations, and communities [8]. Unfortunately, the extent of the success of environmental sustainability among the various stakeholders remains unclear.

Climate change and its respective environmental implications have become a major issue affecting developed and developing countries [9]. In a developing and agro-based country such as Bangladesh, it resulted in an economic hardship owing to its high susceptibility to weather changes [10,11]. Consequently, several strategies, such as the prevention of environmental degradation and the implementation of sustainable development through formal and coordinated green investments as per global norms, have been enacted [1] to mitigate the threats and environmental consequences of climate change [12]. In this regard, banking institutions can play an important role by investing in a variety of environmentally friendly projects, such as renewable energy, clean energy, green industry development and waste management, among others [2,8], all of which directly contribute to the nation's long-term economic development [1]. Therefore, green finance can be regarded as a vital financial instrument for improving the sustainability performance of an organization and the achievement of SDGs in a country.

The financial industry of Bangladesh is not only dominated by banks [13] but also non-bank financial institutions (NBFIs), insurance companies, microfinance institutions, and capital market intermediaries. Under the supervision of Bangladesh Bank (the country's central bank), there are 59 scheduled banks and 5 non-scheduled banks functioning in the country. On the other hand, there are also 34 NBFIs operating businesses in Bangladesh. In comparison to industrialized countries and sophisticated markets, the banking industry meets both the country's long- and short-term finance demands [13,14]. Considering the importance of commercial banks in developing the green economy of Bangladesh, it is imprudent to ignore the financial industry in the economic paradigm shifting toward the integration of environmental factors. In this regard, the banking sector in Bangladesh plays a crucial role in achieving sustainable economic development of the country through its investments in various eco-friendly projects to mitigate the adverse effects of climate change. In addition, many industrial ventures with potentially major negative social or environmental consequences, such as textiles, cement, steel, power, paper, fertilizers, chemicals, and so on rely heavily on banking institutions for funding [13]. As funders, they have a huge impact on industrial projects, and green banking can therefore play an important role in promoting responsible behavior among businesses [1,13]. Green finance can be considered as a critical financial component in ensuring sustainable economic growth in any country. In terms of green financing, private commercial banks (PCBs) are the significant contributors, accounting for around 75% of total green financing in Bangladesh, followed by NBFIs (12%). Hence, it can be noted that banks and NBFIs have been playing a crucial role in the prevention of environmental deterioration as well as the attainment of SDGs in the country through green financing [1,12,13]. As a result, expanding green finance is critical to achieving sustainable economic growth and ecological sustainability, as well as resolving the existing conflict between economic development and environmental conservation [7,15].

The concept of green finance, also known as green investments [1], is widely employed in academia and business, and have a variety of meanings [5]. Green finance (GF) is a developing concept [7] that lacks a clear and universal definition [16]. However, the goal of GF is to balance the advancement of monetary events, environmental stability, and ecological protection to accomplish long-term development [15]. According to Wang and Zhi [17], GF is a new monetary phenomenon that combines economic benefits with environmental conservation, and therefore represents the best option for funding environmentally friendly projects and organizations that prioritize environmental protection [1]. It takes environmental outcomes into account in funding a project and prioritizes investment in various eco-friendly activities, such as renewable energy, waste management (solid and liquid), clean energy, climate change mitigation and adaption strategies, alternative energy, green brick manufacturing, green industry development, paper waste recycling, energy-efficient technology, biodiversity protection, and so on. Therefore, the development of GF is crucial to the banking industry as it aids in the transition to a green economy for better management of concerns, such as climate change, environmental catastrophes,

and energy efficiency. The term "sustainability" can be subsequently described as the ability to preserve well-being over an extended and possibly endless length of time. This mostly addresses the environmental aspect of the three pillars of sustainability (social, economic, and environmental); however, it should be noted that the terms "environment performance" and "sustainability performance" are not synonymous [18]. Sustainability performance refers to a firm's performance in terms of sustainability across all areas and for all determinants of corporate sustainability [19]. Consequently, GF has emerged as a new growth point for the promotion of green economic growth, social responsibility and environmental security [1]. Besides, it also aids banks in improving their sustainability performance [19]. Several nations, such as China and Bangladesh, have developed financial industry sustainability rules in addition to voluntary industry codes of conduct to address both corporate ethics and financial sector stability [20]. For example, Bangladesh Bank established the Environmental Risk Management (ERM) policies for banks and financial institutions in 2011 in order to limit investment in various polluting sectors and enhance financing of more environmentally friendly projects. The ERM guidelines are intended to encourage banks and financial institutions to incorporate social and environmental principles into their credit risk management systems, thereby improving social and environmental standards, as well as sustainability assessment and refinancing initiatives for environmentally friendly projects in Bangladesh [13,20].

Numerous studies have been recently conducted in the field of GF worldwide [1,3,12,16,21–32], and these studies are mostly centered on GF for sustainable economic development [23–25,31,32]; the impact of GF on Fintech [26]; GF trends and opportunities [3,16,22,28]; the environmental effect of GF reform and innovations [17,29]; GF development and sustainability [1,27,33,34]; GF standards and green bonds [21,30]; and GF and sustainable development [12,35–37]. Besides this, a few studies have tried to identify the relationship between GF and the green economy [7,38]; GF, carbon intensity, and non-fossil energy consumption, as well as climate change mitigation in the context of N11, BRICS countries, and China [39,40]; and sustainability performance [19,41]. Although several existing studies have emphasized the practices, prospects, challenges, and sustainable reporting of green financing, bankers' perceptions regarding the major dimensions of GF and the sources of green financing in the context of Bangladesh [1,2,10,32] and the effect of GF dimensions (social, economic, and environmental) on the sustainable performance of banks remain largely unexplored. Based on primary data, limited studies exist on PCBs in Bangladesh. On the other hand, sustainable finance has recently emerged as an appealing subject of study in the sustainability literature; nevertheless, studies in developing nations are lacking in the literature [42]. To the author's knowledge, no study on the factors affecting the sustainability performance of the banks has been conducted.

Therefore, this study attempts to bridge the research gap in the following ways. First, it depicts the present scenario of green financing in the banks and NBFIs in Bangladesh based on the reports of Bangladesh Bank (BB) from 2015 to 2020. Second, it investigates various aspects of GF—social, economic, and environmental—in the context of PCBs in Bangladesh based on the primary data. Third, the study analyzes the impact of the dimensions of GF on the sustainability performance of the banks. Summarily, the main purpose of the study is to measure the major dimensions of GF (social, economic, and environmental) and their effects on the sustainability performance of banks in the context of PCBs in Bangladesh. The study also highlights the state of green financing in the context of banks and NBFIs in Bangladesh from 2015 to 2020. In achieving the aforementioned goals, this study aims to answer the following two questions: (1) "what is the present state of banks and NBFIs' green financing of eco-friendly projects in Bangladesh?" and (2) "What are the impacts of the GF dimensions (social, economic, and environmental) on the sustainability performance of banks in Bangladesh based on the knowledge of bankers?". Furthermore, in comparison with existing works of literature, this study differs in at least three major ways. First, the study presents the current scenario of green financing by banks and NBFIs in Bangladesh based on BB's reports from 2015 to 2020. Second, different aspects of GF,

namely social, economic, and environmental, have all been examined based on the primary data. Third, this study develops a three-dimensional scale of GF to comprehensively quantify its growth and impacts on the sustainability performance of the banking sector in developing countries, such as Bangladesh.

The remainder of the paper is structured as follows: Section 2 presents recent literature on GF, GF dimensions, and sustainability performance, followed by the hypotheses development of the study. Section 3 advances the sampling method, data collection, study instruments, and analysis process. Section 4 deals with the results and findings of the study. Section 5 delineates the discussion and conclusion of the report, after which major policy consequences and limitations are discussed in Section 6 and suggestions for future studies in Section 7. The list of abbreviations and terminologies used in the study are presented in Table 1.

**Table 1.** List of abbreviations and terminologies used in the paper.

| Abbreviation | Explanation | Abbreviation | Explanation |
|---|---|---|---|
| SDGs | Sustainable Development Goals | BB | Bangladesh Bank |
| NBFIs | Non-Bank Financial Institutions | SCBs | State-Owned Commercial Banks |
| SEM | Structural Equation Modeling | DFIs | Development Financial Institutions |
| GF | Green Finance | FCBs | Foreign Owned Commercial Banks |
| PCBs | Private Commercial Banks | ETP | Effluent Treatment Plant |
| ERM | Environmental Risk Management | GHG | Green House Gases |
| Fintech | Financial Technology | CA | Cronbach's Alpha |
| BRICS | Brazil, Russia, India, China, and South Africa | AVE | Average Variance Extracted |
| SP | Sustainability Performance | CR | Composite Reliability |
| ESG | Environmental, social, and governance | GFI | Goodness-of-fit index |
| ECO | Economic Dimension | AGFI | Adjusted goodness-of-fit index |
| SOC | Social Dimension | SRW | Standardized regression weight |
| ENV | Environmental Dimension | CFI | Comparative fit index |
| EFA | Exploratory Factor Analysis | NFI | Normed fit index |
| CFA | Confirmatory Factor Analysis | NNFI | Non-normed fit index |
| SRMR | Standardized Root Mean Residual | TLI | Tucker–lewis index |
| MFIs | microfinance Institutions | AGFI | Adjusted goodness of fit index |
| RMSEA | Root mean square error of approximation | | |

## 2. Literature Review and Hypothesis Development

### *2.1. Literature and Background of the Study*

#### 2.1.1. Green Finance and Its Dimensions

GF has gained significant prominence in the economic discourse among international groups and state governments since its inception [43]. This interest in GF has similarly risen among academics, scholars, researchers, and practitioners [1,44], and now represents a new financial approach that emphasizes green investment to protect the environment and simultaneously promote economic prosperity [34]. GF is considered an essential element of sustainable banking, with a massive impact on the development of a sustainable economy and business in general [1,2,45]. According to the European Commission, the idea of GF in financial services encompasses investment decisions that integrate environmental, social, and governance principles to ensure the satisfaction of clients and society as a whole (Retrieved from https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en; accessed on 5 January 2021). GF is a comprehensive method that blends various approaches for the improvement in the economic, social, and

environmental performance of the monetary system, which is assessed via environmental, social, and governance (ESG) criteria, i.e., factors which are essential parts of sustainable economic development and finance (Financing Sustainable Development: Key Challenges and Prospects, 2019). The major activities of GF include green bonds, microfinancing, sustainable funds, investments in impact, active ownership, credits for sustainable developments, and improvement in entire financial systems in a more viable way [46]. According to the EU high-level expert group on sustainable finance (2017), GF could be broadly described as a financial system that provides and addresses the challenges of sustainable development, sustainable housing, retirement, infrastructure, technological development, climate change mitigation, and other long-term educational and societal issues.

Furthermore, various past studies defined GF as the promotion of economic, social, and environmental influences on financial services [15], with a general impact on the development of a sustainable economy and business [2]. The term "green finance" is the combination of a set of three dimensions regarded as the "Triple Bottom Line," comprising social, economic, and environmental aspects [1,19]. Notably, most studies uniquely identify GF dimensions. However, only a few studies explore the connectivity of GF dimensions—social, economic, and environmental—in the context of banking sector [1,2,32]. More recently, Zheng et al. [1] examined the GF development in the Bangladeshi banking sector, particularly in PCBs, and discovered that the level of awareness, beliefs, and understanding of the major dimensions of GF (social, economic, and environmental) and sources of green financing among PCB bankers were satisfactory for the successful implementation of GF in Bangladesh to facilitate the country's long-term economic development. The study also identified the "economic dimension" as the most important dimension driving GF, followed by the "social" and then "environmental" dimensions. In addition, Rashid [47] examined the impact of green financing by financial and non-financial sectors on the overall economic development of Bangladesh. The investigation revealed that the growth pattern of sustainable financing of the financial sector is marginal compared to the overall credit disbursed and remains below the threshold set by the Bangladesh bank. Although GF has huge prospects for the sustainable economic development of Bangladesh, financial institutions including banks have also identified some of the major challenges of its practices, which include the lack of policy formulation, lack of standardized guidelines for reporting, incorporation of environmental issues, etc. In another study [8], it was stated that the enforcement of clear guidelines by the Bangladesh Bank would result in the successful adoption of sustainable banking in Bangladeshi banks. The study also revealed that the lower growth of technological improvement, innovations of financial products, and a lack of social and ecological consciousness of the general community in the banking enterprises could constitute a hindrance to green growth. Therefore, GF can be said to play a crucial role in the improvement in banks' sustainability performance through the financing of eco-friendly projects, and also the achievement of sustainable economic development of the country.

#### 2.1.2. Sustainability Performance

The term "sustainability" can be described as the ability to preserve well-being over an extended, and possibly endless, length of time, and mostly addresses the environmental aspect of the three pillars of sustainability. However, the terms "environment" and "sustainability" are not synonymous [18]. On the other hand, the performance of a firm in terms of sustainability across all aspects and for all determinants of corporate sustainability is referred to as sustainability performance [19]. In addition, the phrase "corporate sustainability performance" refers to the environmental, social, and economic elements of corporate governance, particularly in general and corporate sustainable management [19,48]. The sustainability strategy of a corporation is defined as a strategy aimed at attaining long-term economic prosperity, ecological sustainability, and social stability for both the organization and its members [49]. More recently, Malsha et al. [19] studied the mediating role of employees' green behavior towards the sustainability performance of the Sri

Lankan banking sector and discovered that green banking practices, such as environmental policies, green financing, green products and services, and green process and procedures, have positively influenced the sustainability performance of the banks. The study also confirmed that employees' green behavior partially mediated the relationship between green banking practices and the sustainability performance of the banks. More recently, Bui et al. [42] studied the major challenges and trends in sustainable corporate finance through a bibliometreic systematic review, and the study identified the six major research gaps in the field of sustainable corporate finance and sustainability, such as sustainable competitive advantages, circular economy, sustainable corporate finance innovation and risk management, corporate finance in sustainability, and sustainable supply chain ethics.

Increasing the sustainability orientation has brought the focus on sustainable finance on corporate sustainability for both academics and practitioners [50]. Corporate sustainability can be defined as the ability of a business to meet the needs of its immediate and indirect stakeholders without harming the needs of future stakeholders [51]. This defines the process of transforming organizations' business models in order to balance concerns about the three pillars of sustainability when expanding long-run operations [52]. Corporate sustainability in sustainable finance has the opportunity to provide a wide array of competitive benefits and affect the development of value in both short and long terms [42]. Corporations with consistent environmental, social, and financial performance are said to be able to achieve cost reductions, lowered litigation, regulatory risks, improved operational efficiency, and more stable financial community and stakeholder interactions [19,42]. Hence, it can be stated that sustainability performance incorporates three components of sustainability (i.e., social, economic, and environmental), and is defined as the accomplishment of well-being by an entity, with the worry of future entities being able to linger. Therefore, based on the above discussion and concept of green finance and sustainability performance adapted from existing literature, this study implements the three essential dimensions of GF as an independent variable and the sustainability performance of the banks as the dependent variable to examine their relationship. The sections below represent the relationships in our study model.

### *2.2. Hypotheses Development*

#### 2.2.1. Economic Dimension of GF and Sustainability Performance

The economic dimension is considered the most important element impacting green financing in the banking sector [1]. According to Zheng et al. [1], the economic aspects of GF comprise concerns that lead to green economic growth, competitive advantage, production of economic value, and the acquisition of financial implications of climate change from the government. Similarly, a study conducted by Raihan [32] investigated bankers' and owners' perspectives of several components of GF, and revealed that bankers' knowledge, awareness, and beliefs about the numerous dimensions of green finance (social, economic, and environmental) were inadequate. On the other hand, the financing of various eco-friendly projects, such as solar energy, alternative energy, green sector development, and waste management, may boost banks' competitive edge, while also facilitating the country's long-term economic progress [2]. Further, the economic aspects of sustainability comprise issues traditionally identified in the yearly financial report of firms, such as the investment in human resources, research and development, salaries and benefits provided, community development, and so on [53]. As for the economic performance, it refers to a company's ability to acquire revenue and market share while simultaneously reducing its operational expenditure and increasing its resource management efficiency [19]. In this study, the economic aspect of GF is regarded as the financing of different environment friendly projects to increase various economic benefits (e.g., creation of more competitive advantage, generation of more revenues, generation of additional economic benefit, reduction in overall risk, improvement in existing assets, and so on) as well as improve sustainability performance of the organizations. Therefore, it can be stated that, to strengthen the competitive advantage of banks, generate more revenues, improve

existing assets, and save investment and other costs, the banking sector should ensure the funding of environmentally friendly projects through sustainable banking in order to improve the social and environmental performance of the banking sectors. Based on the above discussions, the following research hypotheses were developed:

**Hypothesis 1 (H1).** *There is a positive association between the economic and social dimensions of GF.*

**Hypothesis 2 (H2).** *There is a positive relationship between the economic and environmental dimensions of GF.*

**Hypothesis 3 (H3).** *The economic dimension of GF has a positive effect on banks' sustainability performance.*

2.2.2. Social Dimension of GF and Sustainability Performance

In this research, social aspects of GF can be described as the financing of different ecofriendly projects by the banking institutions to gain various social advantages, such as enhancement of banks' image, establishment of trust, stakeholder engagement plans, promotion of brand awareness, provision of better customers' satisfaction, and provision of more employee benefits. The social dimension is considered a form of green investment that integrates environmental sustainability, economic growth, and social equality, and is driven by private sector interests, capable of transforming the employment profile of a community area and making it more appealing for residential and mixed-use investments [54]. Employee health and safety, local community engagement and development programs, improved brand recognition, and stakeholder engagement initiatives are all examples of the social aspects of GF [1,2]. Green financing also delivers diverse social advantages, such as customers' happiness, improved confidence and image, enhanced staff welfare, consideration of the public interest, brand awareness, and ethical and legal responsibility [32]. Further, the goal of social sustainability is to ensure that people's social, economic, and psychological needs are equally met [55]. The influence of the business process on society and rural development is evaluated by social sustainability [56]. On the other hand, the social performance of a company covers its impacts on the communities in which it operates [19], including relationships with employees, safety and health, salaries to manage living costs, non-discrimination, turnover of employees, education and career development, etc. [53]. Based on the above discussions, it can be stated that green financing plays a significant role in preserving the social responsibility of firms since it results in improved employee welfare and local community engagement activities. Therefore, the following research hypotheses were proposed:

**Hypothesis 4 (H4).** *The social dimension of GF has a positive influence on banks' sustainability performance.*

**Hypothesis 5 (H5).** *There is a positive association between the social and environmental dimensions of GF.*

2.2.3. Environmental Dimension of GF and Sustainability Performance

From the environmental dimension, GF has emerged as a new growth point and engine for alleviating environmental challenges, such as climate change, ecological balance, and internal environmental conservation as the focus of sustainable development [7], since it has the potential to reduce the overall internal carbon footprint and external carbon output of a firm [10]. The environmental dimension of GF encompasses the reduction in the consumption of energy, greenhouse gas emissions from banking activities, energy consumption within firms, and analysis of clients' environmental risks that help in organizations' achievement of long-term viability and sustainability [1]. As a result, the implementation of an efficient green economy via GF is a significant option, and also

a route to ensure sustainability via lowered energy use, consumption, and emissions. Furthermore, the environmental components of sustainability refer to the firm's success in fulfilling and surpassing social expectations in caring for local habitats, with existing legislation to implement proactive attitudes towards the achievement of future sustainable development [57]. Organizations having a strong focus on environmental strategies tend to utilize more effective frameworks in handling environmental challenges, which will likely result in a more comprehensive approach to reducing greenhouse gases, with diverse types of emissions being taken into consideration [57,58]. The number of resources that an organization utilizes in its operations, e.g., energy, land, and water, as well as the results of its activities, such as waste, air emissions, chemical residues, and effluents, are all considered as its environmental performance [19,53]. Hence, it can be stated that sustainability performance incorporates three components of sustainability (i.e., social, economic, and environmental), and is defined as the accomplishment of well-being by an entity, with the worry of future entities being able to linger. Therefore, based on the aforementioned studies, the following research hypothesis was formulated:

**Hypothesis 6 (H6).** *The environmental dimension of GF has a positive impact on the banks' sustainability performance.*

### *2.3. Conceptual Framework of the Study*

Figure 1 shows the hypothesized conceptual framework of the study. Based on the theoretical background and review of the existing literature on GF and its various dimensions, as well as the sustainability performance of organizations, a conceptual research model was developed to measure the major dimensions of GF (social, economic, and environmental) and their effects on the sustainability performance of banks in the context of PCBs in Bangladesh.

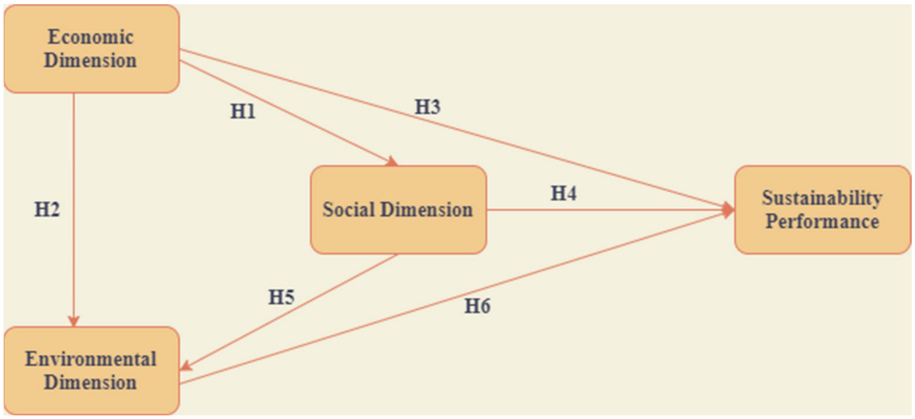


**Figure 1.** Conceptual Framework of the Study.

## 3. Methodology

### *3.1. Sample and Data Collection*

The study aims to assess the major dimensions of GF and their effects on the sustainability performance of banks in Bangladesh using 302 primary survey data (see Appendix A for lists of sample banks used in this study). The study also identifies the state of green financing in banks and NBFIs in Bangladesh from 2015 to 2020. Using a convenience sampling (non-probabilistic) method, the structured questionnaires were administered to the respondents at Dhaka and Chottogram in Bangladesh from January to March 2019. An overall of 354 questionnaires were delivered, while 302 were recovered, indicating a response rate of 85.31%. In both cases, the questionnaires—which take 10–15 min to complete—were administered to bankers (respondents) at a time specified by them. Table 2 presents the demographic information of the respondents and revealed 82.1% and 17.9% as males and females, respectively. In terms of age, 53.0% are middle-aged, while only

5.3% are above 50. Therefore, the majority of bankers in Bangladesh can be described as middle-aged. Additionally, their educational backgrounds revealed that 0.7% have doctorate degree; 93.4%, master's degree; 5.6%, undergraduate degree; and 0.3%, higher secondary certificate (HSC). The empirical findings demonstrated that bankers with higher education certificate are more open to implementing the concepts of green banking and green financing. Moreover, 60.3% of the respondents have had over six years of working experience; 19.99%, three to five years; and the remaining 16.66%, less than three years. Furthermore, 64.9% of the bankers earn between BDT 40,001 and BDT 50,000 monthly, while 17.2% earn between BDT 35,001 and BDT 40,000. Therefore, the results indicate that the average monthly income of the respondents ranges between BDT 40,000 and BDT 50,000 per month.

**Table 2.** Demographic information of the respondents.

| Variable | Description | Frequency | Percentage (%) |
|---|---|---|---|
| Gender | Male | 248 | 82.1 |
| | Female | 54 | 17.9 |
| Age (years) | 18–25 | 5 | 1.7 |
| | 26–30 | 67 | 22.2 |
| | 31–40 | 160 | 53.0 |
| | 41–50 | 54 | 17.9 |
| | 51 and above | 16 | 5.3 |
| Educational qualification | HSC or Equivalent | 1 | 0.3 |
| | Undergraduate/Degree/Diploma | 17 | 5.6 |
| | Master's degree | 282 | 93.4 |
| | M.Phil. or PhD | 2 | 0.7 |
| Working experience | Less than one year | 10 | 3.3 |
| | 1–3 years | 50 | 16.6 |
| | 3–6 years | 60 | 19.9 |
| | Above six years | 182 | 60.3 |
| Monthly income (amount in Bangladeshi Taka) | Upto 10,000 | 1 | 0.3 |
| | 15,001–20,000 | 1 | 0.3 |
| | 20,001–25,000 | 13 | 4.3 |
| | 25,001–30,000 | 19 | 6.3 |
| | 30,001–35,000 | 20 | 6.6 |
| | 35,001–40,000 | 52 | 17.2 |
| | 40,001–50,000 | 196 | 64.9 |
| | 50,001 and above | 1 | 0.3 |

Notes: n = 302, US$1 = 85.05 BDT approximately. Source: Authors' 2021.

### *3.2. Research Instrument*

The dimensions of GF (social, economic, and environmental) and the sustainability performance of the banks were evaluated using a questionnaire that was divided into various sections. The major aspects of GF—social, economic, and environmental—were subsequently developed based on previous studies [1,2,59,60]. Each dimension of the scale is presented below.

The economic (ECO) scale was obtained from several studies [1,2,32] and comprised 11 items that assessed the respondent's agreement or disagreement with the economic aspects of GF in the Bangladeshi banking sector. The social (SOC) scale was similarly obtained from varying studies [1,2,32,60], and comprised nine items that evaluated the respondent's response to the social aspects of GF based on a five-point Likert scale. The environmental (ENV) scale was also adapted from several works of literature [1,2,32,60] and comprised six items that assessed the respondent's agreement or disagreement with the environmental aspects of GF in a five-point Likert scale. Likewise, the banks' sustainability performance (SP) scale was obtained from previous studies [19,41] and is composed of 9 items that determined the agreement or disagreement of the respondents with the sustainability

performance of an organization based on a five-point Likert scale. The five-point Likert scale ranges from one (strongly disagree) to five (strongly agree), and examines the main dimensions of GF and their effects on banks' sustainability performance in Bangladesh (Table 3). Finally, the respondents were also asked dichotomous questions (Yes = 1, No = 0) to assess the significance of green financing on the short and long-term development of the banking industry in Bangladesh.

**Table 3.** Survey items.

| Item | Definition | Source |
|---|---|---|
| ECO1 | Creation of more competitive advantage | [1,2,32,60] |
| ECO2 | Generation of more revenues | |
| ECO3 | Increased contribution to govt. exchequer | |
| ECO4 | Generation of additional economic benefit (economic value added) | |
| ECO5 | Improvement in existing assets (addition to capital) | |
| ECO6 | Reduction in overall risk | |
| ECO7 | Saving investment and other costs | |
| SOC1 | Enhancement of the bank's image | [1,2,32,60] |
| SOC2 | Establishment of trust | |
| SOC3 | Stakeholder's engagement plans | |
| SOC4 | Promotion of brand awareness | |
| SOC5 | Provision of better customers' satisfaction | |
| SOC6 | Provision of more employee benefits | |
| ENV1 | Energy requirements of products and services | [1,2,32,60] |
| ENV3 | Energy consumption outside the organization | |
| ENV6 | Reduction in carbon emissions from banking activities | |
| SP1 | Green financing significantly improves the revenue and market share of our bank. | [19,41] |
| SP2 | Green financing significantly decreases the operational expenditure of our bank. | |
| SP3 | Green financing significantly reduces paper usage and energy consumption in our bank. | |
| SP4 | Green financing improves banks' compliance with environmental standards. | |
| SP6 | Green financing improves the reputation and image of the bank. | |
| SP7 | Green financing improves the relationship between the community and stakeholders. | |

Note: Deleted items from the final analysis are excluded here.

### *3.3. Data Analysis Method*

The employment of a multivariate analysis represents a powerful statistical approach that provides researchers with an accurate and realistic conclusion [61]. Structural Equation Modeling (SEM) is a multivariate method of statistical analysis that evaluates structural relationships. It integrates factor analysis and multiple regression analysis to determine the structural relationship between measurable and latent variables [61]. The primary data collected in the surveys were analyzed using the SPSS 22.0 and AMOS 23.0 to achieve a diversified statistical analysis. We employed the SEM to validate the study hypotheses and also performed the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to assess the accuracy, validity, calculation, and structural models, and the findings were obtained in a variety of ways. The standardized root mean residual (SRMR) is the square root of the difference between the sample and model covariance matrix and should be less than 0.08 to fit the model properly [62].

## 4. Findings of the Study

### *4.1. The Present Scenario of Green Financing in Bangladesh*

Bangladesh's financial sector is primarily a bank-based system comprising NBFIs, intermediaries on capital markets, insurance companies, and microfinance institutions (MFIs) [13,45]. To date, 59 scheduled banks, 34 NBFIs, and 5 non-scheduled banks function under the jurisdiction and supervision of the country's central bank, the Bangladesh Bank (BB) (Bangladesh Bank, 2021). In contrast to developed countries and complex markets, the banking market in Bangladesh is capable of fulfilling its long- and short-term

financing requirements towards achieving sustainable economic development [1,13,63]. Table 4 presents the green projects' financing by state-owned banks (SCBs), development financial institutions (DFIs), foreign-owned banks (FCBs), private commercial banks (PCBs), and NBFIs in Bangladesh from 2015 to 2020. The findings of the study revealed that the total green projects financing by the banks and NBFIs in Bangladesh stood at BDT 1,805,541.19 million between 2015 and 2020. Among the various financial institutions, PCBs were the highest contributor to green financing, accounting for 78.12% of the total green financing in Bangladesh, followed by FCBs (17%), NBFIs (4%), SCBs (1.07%), and DFIs (0.03%). Figure 2 presents the trend of green financing by the banks and NBFIs in the last six years. As opposed to other banks, a positive growth trend of green financing was observed by PCBs during the study period, except for the years 2018 and 2020 during which the growth rate decreased by 84.53% and 11.04%, respectively. Furthermore, the growth rate of NBFIs contracted in the years 2016, 2017, 2018, and 2020 by 28.02%, 18.87%, 75.63%, and 18.53%, respectively. Therefore, it can be concluded that PCBs play a significant role in "greening" the economy of the country by investing in eco-friendly projects.

**Table 4.** Green financing by banks and NBFIs in Bangladesh from 2015 to 2020.

| Sectors | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total | Sector-Wise Contributions |
|---|---|---|---|---|---|---|---|---|
| SCBs (06) | 3,977.70 | 3,248.20 | 7,220.60 | 1,815.20 | 1,219.44 | 1,908.91 | 19,390.05 | 1.07% |
| DFIs (02) | 349.00 | 30.10 | 18.90 | 45.40 | 3.56 | 9.83 | 456.79 | 0.03% |
| FCBs (09) | 71,514.30 | 78,316.10 | 101,524.90 | 192.60 | 19,213.16 | 34,332.69 | 305,093.75 | 16.90% |
| PCBs (40) | 366,233.20 | 404,485.00 | 425,944.50 | 65,904.30 | 78,316.88 | 69,668.75 | 1,410,552.63 | 78.12% |
| NBFIs (33) | 23,813.60 | 17,142.00 | 13,907.70 | 3,389.60 | 6,499.87 | 5,295.20 | 70,047.97 | 3.88% |
| Total (in Million BDT) | 465,887.80 | 503,221.40 | 548,616.60 | 71,347.10 | 105,252.91 | 111,215.38 | 1,805,541.19 | |

Source: Authors' calculations from annual and sustainability reports of Bangladesh Bank (BB) from 2015 to 2020. For more information, see www.bb.org.bd; accessed on 17 April 2021.

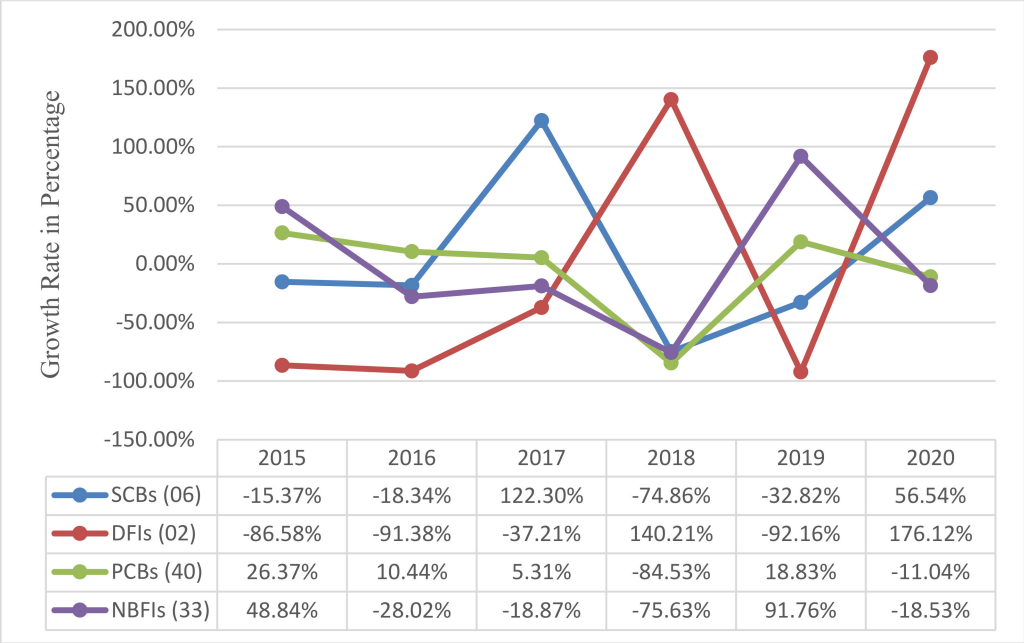


**Figure 2.** The trend of green financing by Banks and NBFIs in Bangladesh from 2015 to 2020. Note: FCBs were excluded from the graph owing to the unexpected growth rate of around 9875.68% in 2019.

Tables 5 and 6 present the sector-wise green financing by the banks and NBFIs in Bangladesh from 2015 to 2020. The empirical findings indicated that the banks were mostly

financing green establishments (34.49%), followed by solid and liquid waste management (24.64%), green brick manufacturing (15.43%), and recycling and recyclable products (10.17%). On the other hand, others, renewable energy, energy efficiency, and alternative energy were the least financed during the study period, accounting for 5.12%, 5.80%, 4.19%, and 0.16%, respectively. From Table 5, it can be concluded that the NBFIs were generally investing in various eco-friendly projects, such as renewable energy (44.73%), green brick manufacturing (14.29%), energy efficiency (14.22%), and green establishments (12.12%). On the contrary, the least financed areas by NBFIs were waste management, recycling and recyclable products, others, and alternative energy, representing 9.01%, 4.16%, 1.42%, and 0.05% of their total green financing, respectively. The growth rate of green financing by banks and NBFIs in Bangladesh from 2016 to 2020 is presented in Figure 3, with a positive growth rate being experienced by the banks due to their investment in eco-friendly projects in the last four years, except in 2016, during which a negative growth rate was recorded. For the NBFIs, a negative growth rate of green financing was observed in the last five years except in 2019, during which a positive growth rate of 47.85% was captured. Therefore, it can be concluded that banking institutions play a crucial role in the sustainable development of the economy through investment in various eco-friendly projects, such as green establishment, waste management, green brick manufacturing, recycling and recyclable products, energy efficiency, and renewable energy.

**Table 5.** Sector-wise green finance by banks from 2015 to 2020 (amount in BDT million).

| Sector-Wise GF | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total | Sector–Wise Contributions |
|---|---|---|---|---|---|---|---|---|
| Green brick manufacturing * | 7,144.10 | 6,552.80 | 5,293.20 | 10,429.20 | 16,899.19 | 8,766.15 | 55,084.64 | 15.43% |
| Green establishment | 3,889.40 | 4,769.80 | 4,846.60 | 10,611.70 | 32,613.52 | 66,390.18 | 123,121.20 | 34.49% |
| Renewable energy | 2,951.90 | 1,835.60 | 2,584.80 | 2,831.70 | 2,156.08 | 2,603.83 | 14,963.91 | 4.19% |
| Waste management * | 3,957.60 | 4,401.20 | 8,802.10 | 35,047.80 | 25,916.10 | 9,822.72 | 87,947.52 | 24.64% |
| Recycling and recyclable product | 2,385.70 | 4,358.70 | 6,096.20 | 3,743.10 | 11,108.68 | 8,594.00 | 36,286.38 | 10.17% |
| Alternative energy | 17.30 | 324.80 | 132.70 | 9.00 | 83.98 | 10.80 | 578.58 | 0.16% |
| Energy efficiency | 1,492.70 | 2,405.00 | 3,120.90 | 3,156.30 | 3,798.78 | 6,726.07 | 20,699.75 | 5.80% |
| Others | 4,422.10 | 910.30 | 1,625.30 | 2,128.80 | 6,176.70 | 3,007.16 | 18,270.36 | 5.12% |
| Total | 26,260.80 | 25,558.20 | 32,501.80 | 67,957.60 | 98,753.03 | 105,920.91 | 356,952.34 | 100.00% |

Note: * waste management includes solid and liquid waste and green brick manufacturing include fire-burnt brick and non-fire block brick. Source: Authors' calculations from annual and sustainability reports of Bangladesh Bank (BB) from 2015 to 2020. For more information, see www.bb.org.bd; accessed on 17 April 2021.

**Table 6.** Sector-wise green finance by NBFIs from 2015 to 2020 (amount in BDT million).

| Sector-Wise GF | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total | Sector-Wise Contributions |
|---|---|---|---|---|---|---|---|---|
| Green brick manufacturing * | 59.00 | 815.00 | 1,085.70 | 560.10 | 1,686.73 | 432.13 | 4,638.66 | 14.29% |
| Green establishment | 80.00 | 256.00 | 900.20 | 658.30 | 1,689.69 | 350.00 | 3,934.19 | 12.12% |
| Renewable energy | 6,249.30 | 3,660.20 | 1,859.00 | 523.90 | 1,286.34 | 942.36 | 14,521.10 | 44.73% |
| Waste management * | 202.00 | 449.00 | 282.40 | 308.80 | 1,443.30 | 240.00 | 2,925.50 | 9.01% |
| Recycling and recyclable product | 124.30 | 518.80 | 180.20 | 124.10 | 130.00 | 272.69 | 1,350.09 | 4.16% |
| Alternative energy | - | 9.20 | - | - | - | 6.00 | 15.20 | 0.05% |
| Energy efficiency | 81.70 | 125.30 | 277.40 | 1,080.60 | 232.81 | 2,819.03 | 4,616.84 | 14.22% |
| Others | 43.20 | 19.30 | 1.20 | 133.80 | 31.00 | 233.00 | 461.50 | 1.42% |
| Total | 6,839.50 | 5,852.80 | 4,586.10 | 3,389.60 | 6,499.87 | 5,295.21 | 32,463.08 | 100.00% |

Note: * waste management includes solid and liquid waste and green brick manufacturing include fire-burnt brick and non-fire block brick. Source: Authors' calculations from annual and sustainability reports of Bangladesh Bank (BB) from 2015 to 2020. For more information, see www.bb.org.bd; accessed on 17 April 2021.

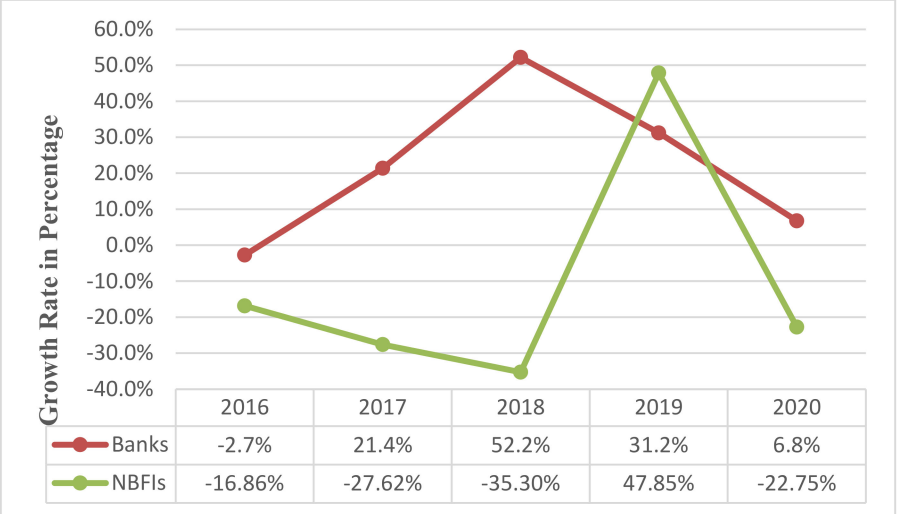


**Figure 3.** The trend of green financing by banks and NBFIs in Bangladesh from 2016 to 2020.

To expand the investment opportunities for environmentally friendly products, such as solar energy, solar mini-grids, green industries, biogas plants, solar home systems, and effluent treatment plants, etc., the BB established a revolving refinance framework with a worth of BDT 2 billion in 2009, which was gradually increased to BDT 4 billion [13]. The Asian Development Bank (ADB) also committed USD 50 million to the "Brick Kiln Efficiency Improvement Project," which was established by the BB in 2012 and geared at developing environmentally friendly brick kilns that promote the efficient use of modern technology and reduce the emission of greenhouse gases (GHG) and suspended particulate matter (SPM) (Bangladesh Bank, 2020). Table 7 highlights the BB's product-wise refinancing scheme for green initiatives between 2015 and 2020. To date, the cumulative amount refinanced under the scheme stood at BDT 3117.04 million, and the major influencing green activities under the scheme were the green industry (40.13%), effluent treatment plants (17.28%), HHK technology in brick kilns (10.90%), safe working environment (9.66%), and biogas (7.41%). On the contrary, solar assembly plants (5.27%), solar home systems (4.43%), energy-efficient technologies (2.24%), paper waste recycling (1.28%), solar irrigation pumps (0.87%), solar mini-grids (0.32%), and vermicompost (0.19%) constituted the least financed green activities between 2015 and 2020. Therefore, while the overall reimbursement

under the green products refinancing plan increased over time, the rate of increase was inconsistent and slow.

**Table 7.** The BB's refinance scheme for the green products/initiatives from 2015 to 2020 (amount in BDT million).

| Types of Green Products | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total | Sector-Wise Contribution |
|---|---|---|---|---|---|---|---|---|
| Effluent treatment plant | 0.00 | 58.00 | 179.60 | 60.00 | 108.40 | 132.50 | 538.50 | 17.28% |
| Paper waste recycling | 0.00 | 20.00 | 20.00 | 0.00 | 0.00 | 0.00 | 40.00 | 1.28% |
| Solar irrigation pump | 26.50 | 0.60 | 0.00 | 0.00 | 0.00 | 0.00 | 27.10 | 0.87% |
| HHK technology in brick kiln | 47.00 | 177.80 | 10.00 | 0.00 | 5.00 | 100.00 | 339.80 | 10.90% |
| Solar mini-grid | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 0.32% |
| Bio gas | 83.30 | 84.80 | 46.60 | 10.50 | 4.60 | 1.24 | 231.04 | 7.41% |
| Green industry | 0.00 | 400.00 | 0.00 | 500.00 | 152.30 | 198.70 | 1,251.00 | 40.13% |
| Solar assembly plant | 148.10 | 16.30 | 0.00 | 0.00 | 0.00 | 0.00 | 164.40 | 5.27% |
| Safe working environment | 0.00 | 35.70 | 55.30 | 82.00 | 40.00 | 88.10 | 301.10 | 9.66% |
| Solar home system (SHS) | 87.50 | 14.70 | 35.30 | 0.00 | 0.20 | 0.45 | 138.15 | 4.43% |
| Vermicompost | 1.10 | 1.60 | 1.30 | 0.00 | 0.80 | 1.26 | 6.06 | 0.19% |
| Energy efficient technology | 0.00 | 0.00 | 0.60 | 13.00 | 10.00 | 46.29 | 69.89 | 2.24% |
| Total (amount in BDT million) | 393.50 | 819.50 | 348.70 | 665.50 | 321.30 | 568.54 | 3,117.04 | 100.00% |

Source: Authors' calculations from annual and sustainability reports of Bangladesh Bank (BB) from 2015 to 2020. For more information, see www.bb.org.bd; accessed on 17 April 2021.

### *4.2. Descriptive Statistics and Outcomes of Exploratory Factor Analysis (EFA)*

Table 8 shows the descriptive statistics, factor extraction loadings and reliabilities of all of the study variables. The table also presents the outputs of the EFA and CFA by utilizing principal components and common factor analysis. According to Cattell (1966), the EFA was used on 22 items to check the factor loadings of the constructs, and the number of factors to be derived was determined by applying eigenvalue standards [64]. The Cronbach's alpha ($\alpha$) coefficients were also employed to determine the validity and reliability of the data. Based on the EFA, three items (ENV2, ENV4, and ENV5) from the environmental factor and two elements (SP5 and SP8) from the sustainability performance were deleted owing to their poor factor loadings. The KMO value of 0.917, which exceeds the minimal acceptable level of 0.5 for the factoring value [65], indicated the sample adequacy. The correlation matrix was determined to be statistically significant by the Bartlett's sphericity test (p 0.000), with an estimated chi-square value of 3033.919. In addition, the total variance accounted for 60.595% for the dimension of green finance and sustainability performance constructs. The communalities of the 22-item model were ranged from 0.500 to 0.797, exceeding the minimum standard value of 0.5 [61]. Consequently, Cronbach's alpha values were used to ascertain the reliability of the constructs whose values ranged from 0.692 to 0.879 [66]. The findings indicate the reliability and validity of the developed items [66].

**Table 8.** The descriptive statistics and outcomes of EFA.

| Variables | Items | Mean | Standard Deviation | Factor Loadings | | | | Eigenvalue | Cronbach's Alpha (α) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | ECO | SOC | ENV | SP | | |
| Economic dimension (ECO) | ECO1 | 3.90 | 1.022 | 0.797 | | | | 3.197 | 0.837 |
| | ECO2 | 3.81 | 1.006 | 0.772 | | | | | |
| | ECO3 | 3.79 | 0.895 | 0.747 | | | | | |
| | ECO4 | 3.97 | 0.837 | 0.698 | | | | | |
| | ECO5 | 3.77 | 0.861 | 0.675 | | | | | |
| | ECO6 | 3.86 | 1.017 | 0.668 | | | | | |
| | ECO7 | 3.92 | 0.949 | 0.655 | | | | | |
| Social dimension (SOC) | SOC1 | 4.23 | 0.860 | | 0.547 | | | 3.035 | 0.879 |
| | SOC2 | 4.22 | 0.900 | | 0.702 | | | | |
| | SOC3 | 3.91 | 0.819 | | 0.779 | | | | |
| | SOC4 | 4.09 | 0.912 | | 0.663 | | | | |
| | SOC5 | 4.20 | 0.941 | | 0.634 | | | | |
| | SOC6 | 3.93 | 0.934 | | 0.532 | | | | |
| Environmental dimension (ENV) | ENV1 | 3.88 | 0.895 | | | 0.626 | | 1.578 | 0.692 |
| | ENV3 | 3.60 | 0.890 | | | 0.589 | | | |
| | ENV6 | 3.77 | 0.974 | | | 0.646 | | | |
| Sustainability performance (SP) | SP1 | 4.01 | 0.872 | | | | 0.536 | 2.803 | 0.863 |
| | SP2 | 4.21 | 0.836 | | | | 0.599 | | |
| | SP3 | 4.11 | 0.888 | | | | 0.684 | | |
| | SP4 | 4.01 | 0.937 | | | | 0.662 | | |
| | SP6 | 3.78 | 0.899 | | | | 0.595 | | |
| | SP7 | 4.04 | 0.885 | | | | 0.500 | | |

Note: Extraction method: principal component analysis; Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) = 0.917; Bartlett's test of sphericity = $p < 0.000$; Variance explained = 60.595%. Source: Authors, 2021.

### *4.3. Discriminant Validity*

The comparison of the AVE square root value and the correlation coefficient between factors was used to verify the validity of discrimination [67,68]. In Table 9, it is clear that the AVE for each factor exceeds their related squared inter-factor correlation. The result in the table revealed a high level of discriminant validity between the factors employed in the model. Therefore, the three-dimensional model of green finance exhibited an adequate model fit, excellent reliability, discriminant validity, and convergent validity.

**Table 9.** The discriminant validity of green finance constructs and sustainability performance.

| | | Mean | SD | ECO | SOC | ENV | SP |
|---|---|---|---|---|---|---|---|
| 1. | Economic dimension (ECO) | 3.86 | 0.67 | *0.661* | | | |
| 2. | Social dimension (SOC) | 4.09 | 0.71 | 0.393 | *0.747* | | |
| 3. | Environmental dimension (ENV) | 3.75 | 0.72 | 0.396 | 0.408 | *0.656* | |
| 4. | Sustainability Performance (SP) | 4.02 | 0.68 | 0.396 | 0.391 | 0.504 | *0.719* |

Note: Diagonal values are AVE root and are indicated in italic type, and off-diagonal values are inter-construct squared correlations.

### *4.4. Measurement Model*

Following the conducted study by Gerbing and Anderson [69], the measurement model was verified using results from the CFA. Afterwards, standardized coefficients and other model fit indices were employed in the evaluation of the model. Table A2 presents the results and standard estimates of factor loadings that were employed in concluding the validity of the GF dimensions and sustainability performance. The standard factor loadings in the CFA analysis ranged from 0.583 to 0.881 for GF dimensions, which is above the 0.5 cut-off value suggested by Hair et al. [61] and indicates the convergent validity for each construct of GF [61,70]. Furthermore, the Cronbach's alpha coefficients (CA), composite reliability (CR), and average variance extracted (AVE) were calculated to establish the reliability of the green finance dimensions and sustainability performance in the Bangladeshi banking sector. The Cronbach's alphas of the economic factor, social factor, and sustainability performance exceeded the minimum threshold of 0.70 [66], while the alphas of the environmental factor were slightly lower (0.692), as depicted in Table 4. Figure 4 shows the outputs of the CFA measurement model of the study and standardized estimates.

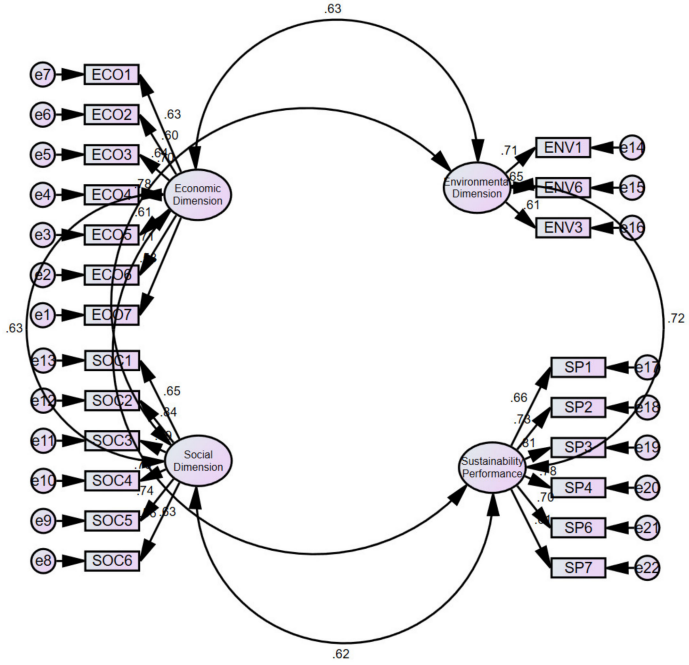


**Figure 4.** CFA measurement model and standardized estimates.

Table A2 (in the Appendix A) indicates that the results of the CR of the four constructs range from 0.693 to 0.881, which exceed the minimum cut-off value of 0.60 [67]. The AVE values, on the other hand, lie between 0.431 and 0.558, which is lower than the recommended value of 0.50 [67]. The AVE is regarded as a "more cautious" approach to assessing the validity of the measurement model [63]. Consequently, the convergent validity of measurements is considered sufficient and acceptable, since the AVE values lie below 0.50 and CR values exceed 0.60 [67,71,72]. Based on the results of the alpha coefficients of Cronbach and CR, it can be concluded that the validity of the constructs and internal consistency of the measurement elements are adequate and acceptable.

Table 10 shows the outputs of the measurement model and reveals the goodness-of-fit indices as being within acceptable limits. Therefore, the fit statistics are $\chi^2/df = 1.511$, GFI = 0.914, RMSEA = 0.042, CFI = 0.945, NFI = 0.855, NNFI = 0.936, TLI = 0.936, AGFI = 0.891, and $p$-value = 0.000. Although the respective values of the NFI and AGFI (0.855 and 0.891) did not attain the threshold of 0.90, they are still acceptable due to their proximity to the reference value. According to Bentler [73], the acceptable value for the GFI,

CFI, NFI, NNFI, TLI, and AGFI is 0.90 or more, and an RMSEA value ≤0.05 is considered adequate. The findings indicate that 22 items from the first-order CFA model of GF dimensions and sustainability performance in the Bangladeshi banking sectors were appropriate for the sample data. Therefore, the overall model fit is adequate and satisfactory.

**Table 10.** Goodness-of-fit statistics for the modified and initial model.

| Variable | $\chi^2$/df | GFI | RMSEA | CFI | NFI | NNFI | TLI | AGFI | *p*-Value |
|---|---|---|---|---|---|---|---|---|---|
| Measurement model | 1.511 | 0.914 | 0.042 | 0.945 | 0.855 | 0.936 | 0.936 | 0.891 | 0.000 |
| Structure model | 1.513 | 0.915 | 0.042 | 0.945 | 0.856 | 0.936 | 0.936 | 0.891 | 0.000 |

Notes: Measurement model–22 items; structure model–22 items; GFI, goodness-of-fit index; RMSEA, root mean square error of approximation; CFI, comparative fit index; NFI, normed fit index; NNFI, non-normed fit index; TLI, tucker–lewis index; AGFI, adjusted goodness of fit index are statistically significant at 0.05 level. Cut-off criteria: $\chi^2$/df < 3; GFI > 0.9; RMSEA < 0.08; CFI > 0.90; NFI > 0.90; NNFI > 0.90; TLI > 0.90; AGFI > 0.090.

### *4.5. Structural Model of the Study*

Figure 5 highlights the structural model of the study and reveals the impact of the association between the inter factors and constructs. The findings indicated that the dimensions of green finance have a positive and substantial influence on the sustainability performance in the Bangladeshi banking sector. Consequently, the ECO dimension of GF has a positive influence on SOC ($\beta$ = 0.63, $p$ < 0.001) and ENV ($\beta$ = 0.38, $p$ < 0.001). Furthermore, the effect of the ECO on SP is positive and statistically significant ($\beta$ = 0.23, $p$ > 0.05), and the SOC dimension of green finance has a positive and significant impact on the SP ($\beta$ = 0.19, $p$ < 0.05), as well as ENV ($\beta$ = 0.40, $p$ < 0.001). Similarly, the impact of ENV on SP is positive and statistically significant ($\beta$ = 0.45, $p$ < 0.001). Summarily, the empirical findings illustrated that the three dimensions of green finance (social, economic, and environmental) have a strong and positive influence on the sustainability performance of the Bangladeshi banking sector.

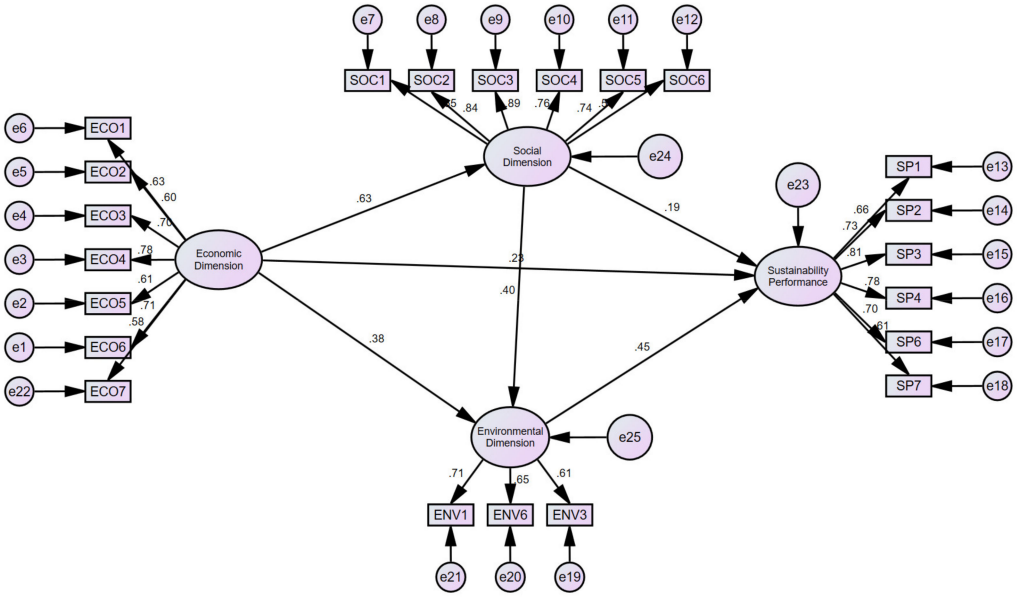


**Figure 5.** Structural model of the study.

### *4.6. Test of Research Hypotheses*

The hypotheses of the study were established via the SEM after confirming the acceptability of the total model fit indices. Table 11 shows that the results of the hypotheses and findings demonstrated that each path was significant at 0.01 level, except for the effect of the ECO on SP ($\beta$ = 0.226, $p$ < 0.05) and SOC on SP ($\beta$ = 0.192, $p$ < 0.05), in which a

positive and statistically significant path coefficient was observed only at the 0.05 level. Conclusively, all research constructs have exhibited a positive and statistically significant impact on the sustainability performance of the banks. Therefore, the results of the study corroborate hypotheses H1, H2, H3, H4, H5, and H6, and shows that the three dimensions of GF are positively and significantly associated with the sustainability performance of the PCBs in Bangladesh.

**Table 11.** Outcomes of the research hypothesis.

| Research Hypothesis | Estimate | *z*-Test | *p*-Value | Accepted/Rejected |
|---|---|---|---|---|
| H1: ECO→SOC | 0.627 *** | 7.980 | 0.000 | *Accepted* |
| H2: ECO→ENV | 0.378 *** | 4.072 | 0.000 | *Accepted* |
| H3: ECO→SP | 0.226 ** | 2.750 | 0.006 | *Accepted* |
| H4: SOC→SP | 0.192 ** | 2.387 | 0.017 | *Accepted* |
| H5: SOC→ENV | 0.401 *** | 4.330 | 0.000 | *Accepted* |
| H6: ENV→SP | 0.453 *** | 4.261 | 0.000 | *Accepted* |

Notes: ** $p < 0.05$; *** $p < 0.01$. Source: Authors' 2021.

To assess the significance of green financing for the short- and long-term development of the banking industry in Bangladesh, respondents were asked the following question: "Do you think that green financing is a vital component of the short and long-term development strategy of your banks?". The results in Figure 6 indicated that 94.70% of the bankers responded in affirmative, while only 4% believed that green financing plays no crucial role in the sustainable growth of their banks. Therefore, it can be concluded that GF is essential for the long-term economic expansion and development of the banking sector in Bangladesh.

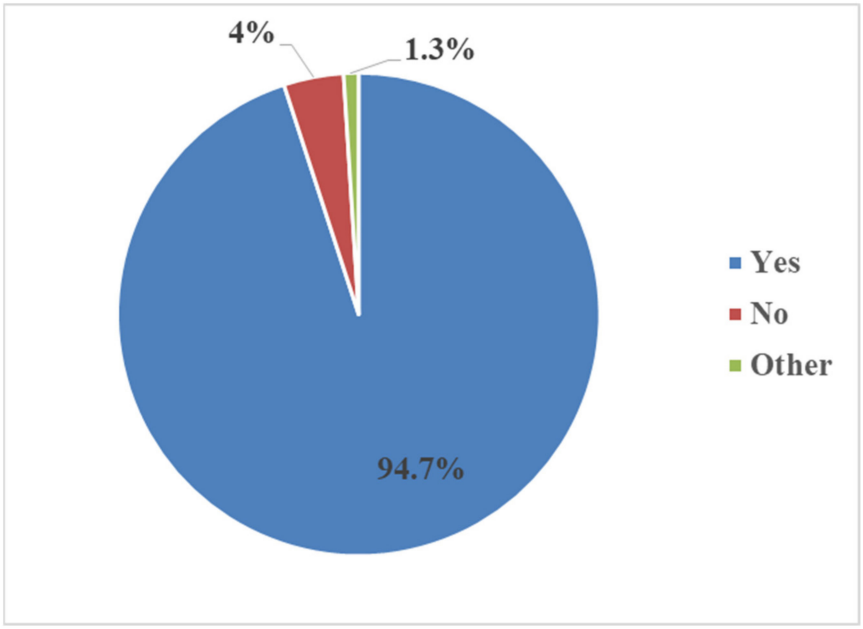


**Figure 6.** The importance of GF for the short- and long-term development strategy of banks.

## 5. Discussion and Conclusions

The main purpose of the study is to identify the impact of GF dimensions on banks' sustainability performance in the context of PCBs in Bangladesh. The study further presents the state of green financing by banks and NBFIs from 2015 to 2020. To assess the effect of GF dimensions on the sustainability performance of the banks, primary data were obtained from bankers of PCBs in Bangladesh. In addition, secondary data were obtained from the published annual reports of the Bangladesh Bank and selected sample banks over the

study period. To test the research hypotheses among the study variables, SEM was used. Descriptive statistics, growth rate, and various graphs were further employed to explore the present conditions of green financing by the banks and NBFIs in Bangladesh. The findings of the study indicated that the total green projects financing by the banks and NBFIs stood at BDT 1,805,541.19 million between 2015 and 2020. Amongst the banks and NBFIs, PCBs were observed to be the highest contributor to green financing, accounting for 78.12% of the total green financing in Bangladesh, succeeded by FCBs (17%), NBFIs (4%), SCBs (1.07%), and DFIs (0.03%). These findings are in agreement with past studies [1,2,10,56]. Furthermore, in comparison with other banks, a positive growth trend of green financing was observed by the PCBs during the study period, except in 2018 and 2020 during which the growth rate decreased by 84.53% and 11.04%, respectively. Additionally, the growth rate of NBFIs was observed to contract by 28.02%, 18.87%, 75.63%, and 18.53% in years 2016, 2017, 2018, and 2020, respectively. These findings are in agreement with other studies [1,13]. Therefore, it can be concluded that PCBs play a significant role in "greening" the economy of the country via investment in eco-friendly projects, thereby fostering the attainment of sustainable development goals (SDGs).

In terms of sector-wise green financing by the banks and NBFIs in Bangladesh during the study period, the findings revealed that the banks were mostly financing green establishments (34.49%), followed by solid and liquid waste management (24.64%), green brick manufacturing (15.43%), and recycling and recyclable products (10.17%). On the other hand, renewable energy, energy efficiency, alternative energy, and others were the least financed by the banks during the study period, accounting for 5.80%, 4.19%, 0.16%, and 5.12%, respectively. The NBFIs generally invested in various eco-friendly projects such as renewable energy (44.73%), green brick manufacturing (14.29%), energy efficiency (14.22%), and green establishment (12.12%). On the contrary, the NBFIs' least financed areas were waste management (9.01%), recycling and recyclable product (4.16%), others (1.42%), and alternative energy (0.05%), respectively. The study further revealed that the banks experienced a positive growth rate via investment in eco-friendly projects in the last four years, except in 2016 during which a negative growth rate was recorded. In contrast, NBFIs observed a negative growth rate of green financing during the last five years, except in 2019 when a positive growth rate of 47.85% was recorded. These findings are supported by the recently conducted studies [1,10,13]. Therefore, it can be asserted that banking institutions contribute to the sustainable development of the economy via investment in various eco-friendly projects such as green establishment, waste management, green brick manufacturing, recycling and recyclable products, energy efficiency, and the renewable energy sector. To expand the investment opportunities for environmentally friendly products, the BB formed a revolving refinance framework with a worth of BDT 2 billion in 2009 and gradually expanded it to BDT 4 billion [13]. Currently, the cumulative amount refinanced under the scheme stands at BDT 3117.04 million. The most influencing activities under the scheme were the green industry (40.13%), effluent treatment plant (17.28%), HHK technology in brick kilns (10.90%), safe working environment (9.66%), and biogas (7.41%). On the contrary, solar assembly plant (5.27%), solar home system (4.43%), energy-efficient technology (2.24%), paper waste recycling (1.28%), solar irrigation pump (0.87%), solar mini-grid (0.32%), and vermicompost (0.19%) constituted the least financed activities between 2015 and 2020. Similar findings were also cited from previous studies [1,2,10,13,45].

Furthermore, the empirical results indicate the validity of hypothesis 1 that the economic aspect of GF has a positive impact on the social aspect of GF dimensions of PCBs in Bangladesh. Besides, the economic aspect of GF positively influenced the environmental aspect of GF dimensions, thus corroborating hypothesis 2. According to these findings, three dimensions of GF, namely social, economic, and environmental, are linked to the ideas of ESG criteria and SDGs. These findings also imply that the three aspects of GF have significant practical implications for banks and financial institutions to improve their sustainability performance by prioritizing investment in environmentally friendly

projects. These observations are consistent with the extant studies [1,32]. The study also discovered a strong positive relationship between the economic dimensions of GF and the sustainability performance of banks, thus validating hypothesis 3. It can be concluded that the economic dimension of GF is one of the most significant characteristics of the organization, owing to its interconnectivity with the social and environmental dimensions of GF and substantial impact on the sustainability performance of the banks. Based on our findings, hypothesis 4 is accepted, indicating that the social aspect of GF has a positive and significant impact on the sustainability performance of the banks. It can be concluded from the findings that investing in environmentally friendly projects has a variety of social benefits, such as improved the bank's image, enhanced trust, stakeholder engagement plans, better customer's satisfaction, more employee benefits, as well as improved organization's sustainability performance. In addition, the findings of this study revealed a strong positive relationship between the social and environmental aspects of GF in the context of PCBs in Bangladesh, thus validating hypothesis 5. These findings are consistent with the previously conducted studies [1,19,32]. Therefore, it can be stated that the social element of GF is another key factor impacting the sustainability performance of banks, as it helps to address the internal and external environmental challenges of organizations, such as carbon emissions and energy consumptions. Finally, hypothesis 6 is validated, confirmed by the statistically significant influence of environmental aspect of GF on the sustainability performance of the banks. This finding is corroborated by the study of Malsha et al. [19], which highlighted that the environmental issues of green banking directly influenced the sustainability performance of the Sri Lankan banking sector. Therefore, it can be inferred that the environmental aspect of GF plays an important role in enhancing the sustainability performance of banks through investment in environmentally favorable projects.

The empirical results indicated that 94.70% of bankers considered green financing to be a significant element in the transient and long-term development plan of the banking industry in Bangladesh. In contrast, only 4% of bankers believed that green financing plays no crucial role in the sustainable growth of their banks. This empirical result is also supported by several studies [59,74], which highlighted GF as being one of the essential points for the growth and development of banks and financial institutions. Recently, everyone is concerned with preserving a healthy environment and ensuring an ecological balance. To increase public understanding of environmental issues, the assistance of a variety of stakeholders, including the general public, the news media, environmental organizations, businesses, and the government, are required. All of these stakeholders have benefitted from a business's sustainability efforts, which have a broader impact on society and the global environment. Banks and financial institutions play a critical role in protecting the environment by financing a variety of eco-friendly projects, such as renewable energy, green sector development, and waste management. Based on our findings, green financing benefits a variety of stakeholders, including bankers, managers, suppliers, academics, and communities, by assisting them in achieving environmental sustainability through the implementation of various strategies such as energy conservation, online banking, paperless transactions, employee engagement programs, and training and development, etc. In summary, green financing is crucial to the country's long-term sustainable economic expansion and development of the banking sector in Bangladesh.

## 6. Implications of the Study

### *6.1. Theoretical Implications*

The study's empirical findings offer a variety of theoretical implications in light of the existing literature on green finance, green finance dimensions, and corporate sustainability performance in the context of banks and financial institutions in emerging economies. This study is regarded as one of the first studies to scientifically assess the various components of green finance (e.g., social, economic, and environmental), as well as their effects on the sustainability performance of banking institutions in Bangladesh. Furthermore, in comparison with existing works of literature, this study differs in at least three major ways.

First, the study presents the scenario of green financing by banks and non-bank financial institutions in Bangladesh from 2015 to 2020. Second, different aspects of green finance, namely social, economic, and environmental, were all examined based on the primary data. Third, this study develops a three-dimensional scale of GF to comprehensively quantify its growth and impacts on the sustainability performance of the banking sector in developing countries such as Bangladesh. This could serve as a starting point for future research in the areas of green financing and sustainability performance of banks and financial institutions. Similarly, this study fills a gap in the literature on green financing and corporate sustainability from the perspective of banking sector, thus providing some insight for scholars, academics, managers, bankers, government officials, clients, and investors in developing countries, such as Bangladesh. In addition, the model developed in this study could be extended to new situations or other developing countries, such as Pakistan, India, and China, among others. Researchers can extend or duplicate this research in the future, as the measurement scales have been validated by AMOS statistical analysis, such as structural equation modeling.

### *6.2. Practical Implications*

The empirical findings also provide some useful implications for financial institutions, managers, bankers, government authorities, clients, and investors of Bangladesh to promote green financing for the sustainable economy of the country. This study assists scholars in understanding the impact of GF components—social, economic, and environmental—on banks' sustainability performance. The following are some of the key policy implications of the study. First, amongst banks and NBFIs in Bangladesh, the PCBs were the highest contributor to green financing, followed by the FCBs. Therefore, the managers of these sample banks should be retained, while the banks should increase their investments in environmentally friendly initiatives to boost the long-term economic prosperity of the country. Second, in terms of sector-wise financing by banks and NBFIs, the study indicated that they invest more in various eco-friendly projects, such as green establishment, waste management, green brick manufacturing, recycling and recyclable products, and energy efficiency. However, there is a need to extend their funding to various energy-related sectors, such as renewable energy, alternative energy, and energy efficiency projects, in order to support the clean energy industry. Third, the empirical data revealed that the three basic elements of GF (social, economic, and environmental) reflect distinct paradigms that are interconnected. Therefore, it is suggested that banks and NBFIs focus more on social activities (local community engagement and development programs, stakeholder engagement programs, brand awareness improvement, and provision of more employee benefits), economic aspects (increment of competitive advantage and long-term benefits, improvement in existing assets, and reduction in the overall risks and cutting down on costs), and environmental aspects (reduction in carbon emissions, energy savings within and outside the organizations, and energy requirements for products and services) to promote green financing in the Bangladeshi banking sector, towards attaining the SDGs. In this regard, the government of Bangladesh can also play a critical role in promoting the benefits of eco-friendly financing amongst the communities towards achieving the nation's long-term economic development. Fourth, the study identified the social, economic, and environmental aspects of GF as having a positive influence on the sustainability performance of the banks. Consequently, it is proposed that banks should invest more in environmentally friendly initiatives to improve their sustainability performance, strengthen their competitive advantage, and lower their total risks. In this regard, the BB should evaluate and offer relevant instructions to sample banks to improve their sustainability performance and promote green financing as a tool for the country's long-term economic development. Finally, the output of the study indicated that the majority of the bankers considered green financing to be a significant element in the transient and long-term development plan of the banking industry in Bangladesh. Therefore, it is suggested that the banking institutions should give more priority to green financing, as it is considered an essential point for their

growth and development. Although much more is to be done to attain an adequate level of green finance in the country, the banking strategy would determine the probability of achieving green financing in the long run. Hence, the government should provide more rewards and incentives to financial institutions based on the level of their green investments to encourage green financing and, in turn, mitigate environmental deterioration.

## 7. Study Limitations and Future Research

Despite the aforementioned reliable empirical results of the study, we admit that the present research work has certain limitations. First, the study was restricted to only 35 PCBs (including eight Islamic banks) out of the total 47 banks operating in Bangladesh (For more details, see https://www.newspapersstore.com/bangladesh-banks-list/; accessed on 11 April 2021). Second, the study only assessed the opinions of bankers regarding the various aspects of green financing and sustainability performance of banks based on the primary data rather than that of clients and owners. Third, seeking information from bankers regarding green financing proved to be difficult due to their lack of knowledge on issues related to GF and sustainability. Fourth, the study employed secondary data acquired from the Bangladesh Bank's annual reports, as well as samples of banks and NBFIs, and subsequently utilized growth rate analysis and other graphs to investigate the trends in green financing. As a result, future research can be improved by employing various statistical approaches, such as *t*-test analysis, trend analysis, and panel data regression models with fixed and random effects. Future research could look into the factors of green financing and its effects on an organization's profitability. Lastly, the simplification of our results means it is restricted to only the banking industry, as they are accountable for the reduction in environmental contamination. Therefore, readers should exercise caution in interpreting the findings, as the outputs may not be generalized beyond the study scope. Future studies can be improved by increasing the number of banks via the inclusion of state and foreign-owned commercial banks and the incorporation of different respondents to obtain data that is representative of Bangladesh. Besides, future research may replicate this study with the clients and owners to assess their perception of various dimensions and sources of GF, and also evaluate the significant challenges of green financing in emerging economies, such as Bangladesh.

**Author Contributions:** Conceptualization, A.B.S.; methodology, A.B.S., G.-W.Z., M.M. and N.F.; software, A.B.S., G.-W.Z. and M.M.; validation, G.-W.Z., A.B.S. and M.M.; investigation, M.M., A.B.S. and N.F.; resources, A.B.S., N.F. and M.M.; data curation, M.M. and A.B.S.; writing—original draft preparation, A.B.S. and M.M.; writing—review and editing, G.-W.Z. and M.M., N.F.; visualization, A.B.S. and M.M.; supervision, G.-W.Z. and M.M.; Funding acquisition, G.-W.Z. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by the Key Research Institute of Philosophy and Social Science of the Education Department of Shaanxi Provincial Government Grant Number is 18JZ010. And APC was funded by the same grant.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** The data that support the findings of this study are available from the corresponding authors (A.B.S.) upon reasonable request.

**Acknowledgments:** The researchers would like to express their gratitude to the anonymous reviewers for their efforts to improve the quality of this paper.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

**Table A1.** Lists of Sample Banks.

| SL | Sample Banks Name | Bank Abbreviation | Dhaka | Chottogram |
|---|---|---|---|---|
| 1 | BRAC Bank Ltd. | BBL | 10 | 10 |
| 2 | Dhaka Bank Ltd. | DBL | 10 | 10 |
| 3 | Dutch Bangla Bank Ltd. | DBBL | 6 | 4 |
| 4 | AB Bank Ltd. | ABBL | 6 | 3 |
| 5 | Bangladesh Commerce Bank Ltd. | BCBL | 6 | 3 |
| 6 | Bank Asia Ltd. | BAL | 6 | 3 |
| 7 | Mercantile Bank Ltd. | MBL | 6 | 3 |
| 8 | Mutual Trust Bank Ltd. | MTBL | 6 | 3 |
| 9 | Eastern Bank Ltd. | EBL | 6 | 4 |
| 10 | IFIC Bank Ltd. | IFICBL | 4 | 3 |
| 11 | Jamuna Bank Ltd. | JBL | 5 | 3 |
| 12 | Prime Bank Ltd. | PBL | 5 | 4 |
| 13 | Pubali Bank Ltd. | PBL | 6 | 5 |
| 14 | National Bank Ltd. | NBL | 6 | 5 |
| 15 | NCC Bank Ltd. | NCCBL | 6 | 3 |
| 16 | NRB Bank Ltd. | NRBBL | 6 | 2 |
| 17 | NRB Commercial Bank Ltd. | NRBCBL | 6 | 2 |
| 18 | NRB Global Bank Ltd. | NRBGBL | 6 | 3 |
| 19 | One Bank Ltd. | OBL | 4 | 5 |
| 20 | Southeast Bank Ltd. | SBL | 7 | 4 |
| 21 | Standard Bank Ltd. | SBL | 7 | 3 |
| 22 | The City Bank Ltd. | CBL | 6 | 3 |
| 23 | United Commercial Bank Ltd. | UCBL | 5 | 3 |
| 24 | Uttara Bank Ltd. | UBL | 4 | 5 |
| 25 | The Premier Bank Ltd. | PBL | 8 | 3 |
| 26 | South Bangla Agriculture and Commerce Bank Ltd. | SBACBL | 6 | 2 |
| 27 | Shahjalal Islami Bank Ltd. | SIBL | 6 | 4 |
| 28 | Export-Import Bank of Bangladesh Ltd. | EXIMBL | 5 | 5 |
| 29 | Islami Bank Bangladesh Ltd. | IBBL | 10 | 13 |
| 30 | Al-Arafah Islami Bank Ltd. | AIBL | 6 | 3 |
| 31 | First Security Islami Bank Ltd. | FSIBL | 6 | 4 |
| 32 | ICB Islamic Bank Ltd. | ICBIBL | 5 | 3 |
| 33 | Union Bank Ltd. | UBL | 6 | 3 |
| 34 | Social Islami Bank Ltd. | SIBL | 6 | 3 |
| 35 | Agrani Bank Ltd. | ABL | 6 | 3 |
| | Total | | 215 | 139 |

**Table A2.** Model estimates and measurement model.

| Variables | Items | SRW | S.E. | Critical Ratio | *p*-Value | CR | AVE |
|---|---|---|---|---|---|---|---|
| ECO→ | ECO7 | 0.583 | 0.087 | 9.289 | 0.000 | 0.843 | 0.437 |
| ECO→ | ECO6 | 0.708 | * | * | * | | |
| ECO→ | ECO5 | 0.612 | 0.078 | 9.728 | 0.000 | | |
| ECO→ | ECO4 | 0.778 | 0.074 | 12.157 | 0.000 | | |
| ECO→ | ECO3 | 0.696 | 0.075 | 10.998 | 0.000 | | |
| ECO→ | ECO2 | 0.604 | 0.088 | 9.607 | 0.000 | | |
| ECO→ | ECO1 | 0.626 | 0.083 | 9.949 | 0.000 | | |
| SOC→ | SOC6 | 0.558 | 0.055 | 10.409 | 0.000 | 0.881 | 0.558 |
| SOC→ | SOC5 | 0.737 | 0.057 | 15.299 | 0.000 | | |
| SOC→ | SOC4 | 0.756 | 0.054 | 15.917 | 0.000 | | |
| SOC→ | SOC3 | 0.887 | * | * | * | | |
| SOC→ | SOC2 | 0.843 | 0.048 | 19.080 | 0.000 | | |
| SOC→ | SOC1 | 0.655 | 0.060 | 12.868 | 0.000 | | |
| ENV→ | ENV1 | 0.708 | * | * | * | 0.693 | 0.431 |
| ENV→ | ENV6 | 0.651 | 0.100 | 9.122 | 0.000 | | |
| ENV→ | ENV3 | 0.606 | 0.108 | 8.633 | 0.000 | | |
| SP→ | SP1 | 0.657 | 0.073 | 11.449 | 0.000 | 0.864 | 0.517 |
| SP→ | SP2 | 0.733 | 0.071 | 12.957 | 0.000 | | |
| SP→ | SP3 | 0.809 | 0.067 | 14.503 | 0.000 | | |
| SP→ | SP4 | 0.779 | * | * | * | | |
| SP→ | SP6 | 0.704 | 0.077 | 12.387 | 0.000 | | |
| SP→ | SP7 | 0.607 | 0.073 | 10.470 | 0.000 | | |

Notes: SRW, standardized regression weight; S.E., standard error; CR, composite reliability; AVE, average variance extracted; * Unstandardized regression weights anticipated as 1.

## References


1. Zheng, G.-W.; Siddik, A.B.; Masukujjaman, M.; Fatema, N.; Alam, S.S. Green Finance Development in Bangladesh: The Role of Private Commercial Banks (PCBs). *Sustainability* **2021**, *13*, 795. [CrossRef]
2. Akter, N.; Siddik, A.B.; Mondal, M.S.A. Sustainability Reporting on Green Financing: A Study of Listed Private Sustainability Reporting on Green Financing: A Study of Listed Private Commercial Banks in Bangladesh. *J. Bus. Technol.* **2018**, *12*, 14–27.
3. Akomea-Frimpong, I.; Adeabah, D.; Ofosu, D.; Tenakwah, E.J. A review of studies on green finance of banks, research gaps and future directions. *J. Sustain. Financ. Investig.* **2021**, *11*, 1–24.
4. Amidjaya, P.G.; Widagdo, A.K. Sustainability reporting in Indonesian listed banks. *J. Appl. Account. Res.* **2020**, *21*, 231–247. [CrossRef]
5. Dörry, S.; Schulz, C. Green financing, interrupted. Potential directions for sustainable finance in Luxembourg. *Local Environ.* **2018**, *23*, 717–733. [CrossRef]
6. Lewis, J.I. *Green Innovation in China: China's Wind Power Industry and the Global Transition to a Low-Carbon Economy*; Columbia University Press: New York, NY, USA, 2012.
7. Liu, N.; Liu, C.; Xia, Y.; Ren, Y.; Liang, J. Examining the coordination between green finance and green economy aiming for sustainable development: A case study of China. *Sustainability* **2020**, *12*, 3717. [CrossRef]
8. Zhixia, C.; Hossen, M.M.; Muzafary, S.S.; Begum, M. Green banking for environmental sustainability-present status and future agenda: Experience from Bangladesh. *Asian Econ. Financ. Rev.* **2018**, *8*, 571–585. [CrossRef]
9. Ngwenya, N.; Simatele, M.D. The emergence of green bonds as an integral component of climate finance in South Africa. *S. Afr. J. Sci.* **2020**, *116*, 10–12. [CrossRef]
10. Hossain, M. Green Finance in Bangladesh: Policies, Institutions, and Challenges. *ADBI Work. Pap. Ser. 892* **2018**, 1–24.
11. Naim, M.J.; Begum, K. Role of Banking in Sustainable Financing: Impact on Achievement of Sustainable Development Goals in Bangladesh. *Cost Manag.* **2019**, *47*, 36–41.

12. Hossain, M. Green Finance in Bangladesh Barriers and Solutions. In *Handbook of Green Finance*; Sustainable Development; Springer: Singapore, 2019; pp. 1–26. ISBN 9789811087103.
13. Khairunnessa, F.; Vazquez-Brust, D.A.; Yakovleva, N. A Review of the Recent Developments of Green Banking in Bangladesh. *Sustainability* **2021**, *13*, 1904. [CrossRef]
14. Wendt, K. *Responsible Investment Banking: Risk Management Frameworks, Sustainable Financial Innovation and Softlaw Standards*; Springer International Publishing: Berlin, Germany, 2015.
15. Zhou, X.; Tang, X.; Zhang, R. Impact of green finance on economic development and environmental quality: A study based on provincial panel data from China. *Environ. Sci. Pollut. Res.* **2020**, *27*, 19915–19932. [CrossRef] [PubMed]
16. Rawat, S.K. Recent Advances in Green Finance. Int. *J. Recent Technol. Eng.* **2020**, *8*, 5528–5533.
17. Wang, Y.; Zhi, Q. The Role of Green Finance in Environmental Protection: Two Aspects of Market Mechanism and Policies. *Energy Procedia* **2016**, *104*, 311–316. [CrossRef]
18. Kuhlman, T.; Farrington, J. What is Sustainability? *Sustainability* **2010**, *2*, 3436–3448. [CrossRef]
19. Malsha, K.P.P.H.G.N.; Anton Arulrajah, A.; Senthilnathan, S. Mediating role of employee green behaviour towards sustain-ability performance of banks. *J. Gov. Regul.* **2020**, *9*, 92–102.
20. Weber, O.; Chowdury, R.K. Corporate sustainability in bangladeshi banks: Proactive or reactive ethical behavior? *Sustainability* **2020**, *12*, 7999. [CrossRef]
21. Taghizadeh-Hesary, F.; Yoshino, N.; Phoumin, H. Analyzing the Characteristics of Green Bond Markets to Facilitate Green Finance in the Post-COVID-19 World. *Sustainability* **2021**, *13*, 5719. [CrossRef]
22. Wang, M.; Li, X.; Wang, S. Discovering research trends and opportunities of green finance and energy policy: A data-driven scientometric analysis. *Energy Policy* **2021**, *154*. [CrossRef]
23. Wang, X.; Zhao, H.; Bi, K. The measurement of green finance index and the development forecast of green finance in China. *Environ. Ecol. Stat.* **2021**, *28*, 263–285. [CrossRef]
24. Zhang, B.; Wang, Y. The Effect of Green Finance on Energy Sustainable Development: A Case Study in China. *Emerg. Mark. Financ. Trade* **2021**, *57*, 3435–3454. [CrossRef]
25. Zhang, D.; Mohsin, M.; Rasheed, A.K.; Chang, Y.; Taghizadeh-Hesary, F. Public spending and green economic growth in BRI region: Mediating role of green finance. *Energy Policy* **2021**, *153*, 112256. [CrossRef]
26. He, Z.; Liu, Z.; Wu, H.; Gu, X.; Zhao, Y.; Yue, X. Research on the Impact of Green Finance and Fintech in Smart City. *Complexity* **2020**, *2020*, 6673386. [CrossRef]
27. Dikau, S.; Volz, U. Central Banking, Climate Change, and Green Finance. In *Handbook of Green Finance*; Springer: Singapore, 2019; pp. 81–102.
28. Gilchrist, D.; Yu, J.; Zhong, R. The Limits of Green Finance: A Survey of Literature in the Context of Green Bonds and Green Loans. *Sustainability* **2021**, *13*, 478. [CrossRef]
29. Huang, H.; Zhang, J. Research on the Environmental Effect of Green Finance Policy Based on the Analysis of Pilot Zones for Green Finance Reform and Innovations. *Sustainability* **2021**, *13*, 3754. [CrossRef]
30. Nedopil, C.; Dordi, T.; Weber, O. The Nature of Global Green Finance Standards—Evolution, Differences, and Three Models. *Sustainability* **2021**, *13*, 3723. [CrossRef]
31. Niyazbekova, S.; Jazykbayeva, B.; Mottaeva, A.; Beloussova, E.; Suleimenova, B.; Zueva, A. The Growth of "Green" finance at the global level in the context of sustainable economic development. *E3S Web Conf.* **2021**, *244*. [CrossRef]
32. Raihan, M.Z. Sutainable Finance for Growth and Development of Banking Industry in Bangladesh: An Equity Perspective. *MIST J. Sci. Technol.* **2019**, *7*, 41–51.
33. Fedorova, E.P. Role of the State in the Resolution of Green Finance Development Issues. *Financ. J.* **2020**, *12*, 37–51. [CrossRef]
34. Wang, K.; Tsai, S.-B.; Du, X.; Bi, D. Internet Finance, Green Finance, and Sustainability. *Sustainability* **2019**, *11*, 3856. [CrossRef]
35. Jha, B.; Bakhshi, P. Green Finance: Fostering Sustainable Development in India. *Int. J. Recent Technol. Eng.* **2019**, *8*, 3798–3801.
36. Mohd, S.; Kaushal, V.K. Green Finance: A Step towards Sustainable Development. *MUDRA J. Financ. Account.* **2018**, *5*, 59–74. [CrossRef]
37. Tolliver, C.; Keeley, A.R.; Managi, S. Green bonds for the Paris agreement and sustainable development goals. *Environ. Res. Lett.* **2019**, 14. [CrossRef]
38. Shalneva, M.S.; Zinchenko, Y.V. *Sustainable Finance as a Way of European Companies' Transition to Green Economy*; Springer International Publishing: New York, NY, USA, 2019; Volume 57.
39. Nawaz, M.A.; Seshadri, U.; Kumar, P.; Aqdas, R.; Patwary, A.K.; Riaz, M. Nexus between green finance and climate change mitigation in N-11 and BRICS countries: Empirical estimation through difference in differences (DID) approach. *Environ. Sci. Pollut. Res.* **2020**, *28*, 6504–6519. [CrossRef] [PubMed]
40. Ren, X.; Shao, Q.; Zhong, R. Nexus between green finance, non-fossil energy use, and carbon intensity: Empirical evidence from China based on a vector error correction model. *J. Clean. Prod.* **2020**, *277*. [CrossRef]
41. Khan, E.A.; Quaddus, M. Development and Validation of a Scale for Measuring Sustainability Factors of Informal Microenterprises–A Qualitative and Quantitative Approach. *Entrep. Res. J.* **2015**, *5*, 347–372.
42. Bui, T.D.; Ali, M.H.; Tsai, F.M.; Iranmanesh, M.; Tseng, M.-L.; Lim, M.K. Challenges and Trends in Sustainable Corporate Finance: A Bibliometric Systematic Review. *J. Risk Financ. Manag.* **2020**, *13*, 264. [CrossRef]

43. Zhang, D.; Zhang, Z.; Managi, S. A bibliometric analysis on green finance: Current status, development, and future directions. *Financ. Res. Lett.* **2019**, *29*, 425–430. [CrossRef]
44. Zhang, D. Energy Finance: Background, Concept, and Recent Developments GUEST EDITOR'S INTRODUCTION. *Emerg. Mark. Financ. Trade* **2018**, *54*, 1687–1692. [CrossRef]
45. Hoque, N.; Mowla, M.M.; Uddin, M.S.; Mamun, A.; Uddin, M.R. Green Banking Practices in Bangladesh: A Critical Investi-gation. *Int. J. Econ. Financ.* **2019**, *11*, 58–68. [CrossRef]
46. Lancet, R. *Reports of the Advisory Scientific Committee No 6/February 2016 Too Late, Too Sudden: Transition to a Low-Carbon Economy and Systemic Risk*; European Systemic Risk Board: Frankfurt, Germany, 2017.
47. Rashid, M.H.U. Green Financing for Sustainability: Challenges and Prospects of Bangladesh. In Proceedings of the International Conference on Finance for Sustainable Growth and Development; Jahur, M.S., Uddin, S.M.S., Eds.; Department of Finance, Faculty of Business Administration, University of Chittagong: Chittagong, Bangladesh, 2018; pp. 129–147.
48. Schaltegger, S.; Wagner, M. Integrative management of sustainability performance, measurement and reporting. *Int. J. Account. Audit. Perform. Eval.* **2006**, *3*, 1–19. [CrossRef]
49. Zimmermann, S. Same Same but Different: How and Why Banks Approach Sustainability. *Sustainability* **2019**, *11*, 2267. [CrossRef]
50. Siegrist, M.; Bowman, G.; Mervine, E.; Southam, C. Embedding environment and sustainability into corporate financial deci-sion-making. *Account. Financ.* **2020**, *60*, 129–147. [CrossRef]
51. Dyllick, T.; Hockerts, K. Beyond the business case for corporate sustainability. *Bus. Strateg. Environ.* **2002**, *11*, 130–141. [CrossRef]
52. Schaltegger, S.; Lüdeke-Freund, F.; Hansen, E. Business Cases for Sustainability: The Role of Business Model Innovation for Corporate Sustainability. *Int. J. Innov. Sustain. Dev.* **2012**, *6*, 95–119. [CrossRef]
53. Kestane, A.; Kurnaz, N.; Sizer, M.O. Assessment of sustainability performance by gray relational analysis method in financial Institutions: Applications in Turkish banking sector. *Turkish Stud. Econ. Financ. Polit.* **2019**, *14*, 1323–1358.
54. Curran, W.; Hamilton, T. *Just Green Enough: Urban Development and Environmental Gentrification*, 1st ed.; Routledge: London, UK, 2017; ISBN 9781315229515.
55. Popovic, T.; Kraslawski, A.; Avramenko, Y. Applicability of Sustainability Indicators to Wastewater Treatment Processes. In *23rd European Symposium on Computer Aided Process Engineering*; Kraslawski, A., Turunen, I., Eds.; Computer Aided Chemical Engineering; Elsevier: Amsterdam, The Netherlands, 2013; Volume 32, pp. 931–936.
56. Fernando, A.L.; Rettenmaier, N.; Soldatos, P.; Panoutsou, C. 8-Sustainability of Perennial Crops Production for Bioenergy and Bioproducts. In *Perennial Grasses for Bioenergy and Bioproducts*; Alexopoulou, E., Ed.; Academic Press: Cambridge, CA, USA, 2018; pp. 245–283. ISBN 978-0-12-812900-5.
57. Judge, W.Q.; Douglas, T.J. Performance Implications of Incorporating Natural Environmental Issues into the Strategic Planning Process: An Empirical Assessment. *J. Manag. Stud.* **1998**, *35*, 241–262. [CrossRef]
58. Czerny, A.; Letmathe, P. Eco-efficiency: GHG reduction related environmental and economic performance. The case of the companies participating in the EU Emissions Trading Scheme. *Bus. Strateg. Environ.* **2017**, *26*, 791–806. [CrossRef]
59. Tu, T.T.T.; Dung, N.T.P. Factors affecting green banking practices: Exploratory factor analysis on Vietnamese banks. *J. Econ. Dev.* **2017**, *24*, 04–30. [CrossRef]
60. Nwobu, O.A.; Owolabi, A.A.; Iyoha, F.O. Sustainability reporting in financial institutions: A study of the Nigerian banking sector. *J. Internet Bank. Commer.* **2017**, *22*, 1–15.
61. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 4th ed.; Prentice Hall: Hoboken, NJ, USA, 2010.
62. Hu, L.T.; Bentler, P.M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alter-natives. *Struct. Equ. Model.* **1999**, *6*, 1–55. [CrossRef]
63. Bose, S.; Khan, H.Z.; Monem, R.M. Does green banking performance pay off? Evidence from a unique regulatory setting in Bangladesh. *Corp. Gov. Int. Rev.* **2020**, *29*, 162–187. [CrossRef]
64. Cattell, R.B. The scree test for the number of factors. *Multivariate Behav. Res.* **1966**, *1*, 245–276. [CrossRef] [PubMed]
65. Spicer, J. *Making Sense of Multivariate Data Analysis: An Intuitive Approach*; Sage Publications: Thousand Oaks, CA, USA, 2005.
66. Nunnally, J.C. An Overview of Psychological Measurement. In *Clinical Diagnosis of Mental Disorders*; Springer: Boston, MA, USA, 1978; pp. 97–146.
67. Fornell, C.; Larcker, D.F. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *J. Mark. Res.* **1981**, *18*, 382–388. [CrossRef]
68. Chin, W. The Partial Least Squares Approach to SEM chapter. *Mod. Methods Bus. Res.* **1998**, *7*, 295–336.
69. Gerbing, D.W.; Anderson, J.C. An updated paradigm for scale development incorporating unidimensionality and its assessment. *J. Mark. Res.* **1988**, *25*, 186–192. [CrossRef]
70. Amin, M.; Isa, Z. An examination of the relationship between service quality perception and customer satisfaction: A SEM approach towards Malaysian Islamic banking. *Int. J. Islam. Middle East. Financ. Manag.* **2008**, *1*, 191–209. [CrossRef]
71. Huang, C.-C.; Wang, Y.-M.; Wu, T.-W.; Wang, P.-A. An Empirical Analysis of the Antecedents and Performance Consequences of Using the Moodle Platform. *Int. J. Inf. Educ. Technol.* **2013**, *3*, 217–221. [CrossRef]
72. Lam, L.W. Impact of competitiveness on salespeople's commitment and performance. *J. Bus. Res.* **2012**, *65*, 1328–1334. [CrossRef]

73. Bentler, P.M.; Bonett, D.G. Significance tests and goodness of fit in the analysis of covariance structures. *Psychol. Bull.* **1980**, *88*, 588–606. [CrossRef]
74. Raihan, M.Z.; Khan, M.S.U. Sustainable Finance-A Prerequisite for Growth & Development of Banking Industry in Bangladesh. In Proceedings of the Finance for Sustainable Growth and Development; Department of Finance, Faculty of Business Admin-istration, University of Chittagong: Chittagong, Bangladesh, 2018; pp. 29–49.