An International Journal

Indonesian Journal of Economics, Business, Accounting, and Management

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Journal Homepage: https://journal.seb.co.id/ijebam/index

Green Finance and Sustainable Development: A Cross-Sectional Study of Financial Mechanisms Driving Environmental Responsibility

Saeed Angorani[1*]

[1]Research Scholar, Lisbon School of Economics & Management (ISEG), University of Lisbon. 1649-004 Lisbon, Portugal.

[*]Corresponding Author, E-mail: saeedangorani@phd.iseg.ulisboa.pt

ARTICLE INFORMATION

Section
Research Articles

Article History
Article Submitted: 15/03/2024
Accepted: 21/03/2024
Available online: 13/05/2024

Keywords
green finance
environmental responsibility
sustainable development
regulatory environment
corporate social responsibility (csr)
innovative financial products

ABSTRACT

The purpose of this cross-sectional study is to investigate the complex connections that exist between environmental responsibility, sustainable development, and green financing mechanisms in financial institutions. The study employs quantitative approaches and cross-sectional analysis using a sample of 500 financial representatives to investigate connections between variables. To find patterns, statistical procedures including regression, t-test, and correlation are used. This research offers significant understanding of the complex relationships affecting environmental responsibility in the finance industry. The connections between green finance, innovation, CSR integration, and regulatory frameworks provide a thorough knowledge of the ways in which financial institutions may actively support sustainable development objectives.

INTRODUCTION

Green finance and sustainable development represent a paradigm shift in the way we approach economic growth, environmental preservation, and social equity (Kwilinski, Lyulyov and Pimonenko, 2023). In an era marked by hitherto unseen obstacles like resource depletion, social injustice, and climate change, incorporating green finance techniques is essential to creating a future that is both ecologically conscious and economically stable (Ye *et al.*, 2022). This transformative approach emphasises the need for a comprehensive strategy that takes into the long-term well-being of our planet and its people by acknowledging the complex interactions

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

between the economic, environmental, and social systems. Beyond traditional investment models, green finance focuses on the allocation of money to projects and activities that not only produce financial returns but also favourably impact social inclusion and environmental sustainability (Udeagha and Ngepah, 2023). It represents a shift from the conventional wisdom that sees environmental preservation and economic growth as antagonistic objectives. Rather, green finance aims to match financial choices with more general sustainability goals, understanding that economies' health is inextricably tied to the health of the ecosystems they depend on and the social fabric they affect (Madaleno, Dogan and Taskin, 2022).

The growing risks associated with climate change, biodiversity loss, and socioeconomic inequities highlight the need for green financial solutions (D'Orazio, 2023). A worldwide awakening has been sparked by the scientific agreement that climate change is manmade, forcing corporations, financial institutions, and governments to reevaluate their responsibilities in a world confronting environmental challenges (Setyowati, 2023). Given this, green finance becomes apparent as a major force for change, providing a route forward for a future that is more resilient and sustainable (Streimikiene and Kaftan, 2021). Integrating environmental, social, and governance (ESG) attentions into investment decisions is one of the core tenets of green finance (Ma'ruf, Mahomed and Mohamad, 2021). According to Gregory, Stead and Stead (2021), this method goes beyond the conventional financial measures by accounting for the projects' effects on the environment, its social ramifications, and the general governance structure of the participating organisations. Green finance aims to steer money towards actions that positively affect the environment and society while reducing negative externalities by integrating ESG issues (Liang and Renneboog, 2020).

Green finance ideas are being adopted by a broad range of Monk and Perkins (2020). Sustainability is becoming more and more popular in the financial sector, as more investors, asset managers, and financial institutions include it into their main business plans. One example of the rising trend of financial instruments specifically created to support environmentally friendly initiatives is the emergence of green bonds (Hadaś-Dyduch *et al.*, 2022). These bonds raise money for projects including energy efficiency campaigns, the construction of sustainable infrastructure, and renewable energy projects. Moreover, green financing is in accordance with the United Nations Sustainable Development Goals, which set forward a more comprehensive worldwide agenda for sustainable development (SDGs). A road map for tackling issues including poor, injustice, deterioration of the environment, climate change, peacefulness, and fairness is provided by these aims. A symbiotic link between financial success and societal well-being is created by green finance, which is a potent vehicle for mobilising resources towards accomplishing these goals (Iacobuţă *et al.*, 2022).

A revolutionary path toward a more peaceful cohabitation of economic success, ecological integrity, and social fairness is represented by sustainable development and green money. The incorporation of green finance concepts into investment choices and corporate tactics is a crucial measure towards tackling the many issues confronting our world (Hariram *et al.*, 2023). Green finance has the ability to fundamentally alter the global economic landscape and make a substantial contribution to the development of a more sustainable and inclusive future by promoting the alignment of financial incentives with environmental and social objectives. Green finance will surely continue to develop and play a crucial part in determining the fate of our planet as the globe makes its way towards a more sustainable and greener future (Liu, Lei and Zhang, 2021).

This cross-sectional study looks at the many tactics and tools used by companies, governments, and financial institutions to promote environmental responsibility in an effort to offer light on how the field of green finance is changing. We hope that our examination of the complex aspects of this junction will provide important new information to the continuing

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

conversation about how to support a financial system that is in keeping with sustainable development's tenets. The objectives of the study are as follows:

1. To assess the level of environmental responsibility exhibited by financial institutions.
2. To examine the relationship between green finance investments and environmental responsibility.
3. To evaluate the influence of the regulatory environment on the sustainable development practices of financial institutions.
4. To investigate the association between corporate social responsibility initiatives and environmental responsibility in the financial sector.
5. To analyse the impact of innovation in financial products on the overall sustainable development practices of financial institutions.

The study's framework is divided into seven distinct parts. The second segment's primary focus is the literature review. The recommended approach is then covered in the third part, along with the research design, methodology employed, and hypothesis formulation. The findings of the hypothesis testing are examined in the next section. In the fifth section, there is a comprehensive discussion. In the sixth section, the study's ramifications are then looked at. Concluding remarks, an overview of the study findings, and a summary are included in the seventh and last section.

LITERATURE REVIEW & HYPOTHESIS

Zhou, Tang and Zhang (2020) investigated how green money affects environmental quality and economic growth. We utilise data from 2010 to 2017 about thirty Chinese provinces and municipalities' green spending, economic growth, and environment protection. The model demonstrated the beneficial impact of green money for environmental enhancement. Green financing does, however, have varying effects on environmental quality depending on the economic development level. Finally, using the concept of the environmental Kuznets curve, a model of how green financing influences the relationship between environmental quality and economic development is developed. According to the concept, green finance has the potential to greatly enhance this link and provide a situation where both the environment and economic development benefit.

Cui, Wang and Wang (2020) examined how each factor affected the evolution and changes in the green finance industry. The investigation focuses on the equilibrium strategy and the influence mechanism of the involved actors. The outcome demonstrated that: first, advancements in sustainability and cleaner manufacturing are positively impacted by the integrity of the green finance system. Second, it is imperative to tighten government regulations, cut the production costs of green finance for businesses and financial institutions, boost compensation for consumer pollution, and lower government oversight expenses.

Falcone and Sica (2019) provide actual proof of the potential and difficulties associated with green finance (GF), examining the economic obstacles that might impede green enterprises' investment choices. In order to do this, they investigated the situation utilising a content analysis approach supported by a survey to examine Italian biomass suppliers given to a group of specialists. Experts acknowledge that while GF may offer a means of attaining ecologically friendly innovation routes, biomass producers still have to confront financial and institutional barriers while attempting to finance their investment plans. Gangi *et al.* (2019) examined the driving forces behind banks' efforts to become greener, and after looking into the connection between a bank's environmental involvement and risk, it was discovered that banks with more environmental consciousness also had lower risk.

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Hsu *et al.* (2021) examined the relationship between green technical innovation and the growth of green finance in West and Central China, as well as the impact of this relationship on regional economic growth. In mainland China, empirical investigations employing econometric estimation were conducted utilising the Ordinary Least Square (OLS) paradigm. According to the research, green finance limits overinvestment in clean energy by reducing short-term lending. Long-term loans, on the other hand, have minimal influence on overinvestment in renewable energy, and the intermediary effect cannot be sustained. Green financial growth will, in the meanwhile, decrease overinvestment in renewable energy and, to a certain extent, boost the productivity of renewable energy investments.

Guang-Wen and Siddik (2022) investigated the effects of corporate social responsibility (CSR) and green financing on the environment financial performance of banks in developing countries such as Bangladesh. By applying a convenience sampling method that is non-probabilistic, 388 workers of Private Commercial Banks (PCBs) in Bangladesh provided primary data, which were then analysed using the Structural Equation Modelling (SEM) method to determine the relationship among the factors under investigation. The findings indicated that the environmental performance is positively impacted by CSR initiatives. Arian, Sands and Tooley (2023) investigated characteristics across businesses operating in various industrial sectors over time in order to determine the longitudinal association between CSR performance and financial success. Panel regression research on publicly traded Australian companies from 2007 to 2021 reveals a favourable relationship between financial performance and CSR performance. Moreover, our sector-specific study reveals noteworthy differences

Saeed, Mudliar and Kumari (2023) examined the connection between Ghana's publicly traded financial firms' financial performance and corporate social responsibility. Secondary data was supplied by twelve financial institutions that are listed on the Ghana Stock Exchange (GSE) over a ten-year period (2010–2019). Regression results, rotating factors, factor score efficiency, descriptive statistics, and a correlation matrix were used to analyse the data. The evidence indicates that CSR, has a positive impact on stock returns and profitability. This shows that even if CSR increases a company's potential for financial success, it should be considered an essential component of long-term business plans rather than an elective.

Park and Kim (2020) gave an overview of green banking, highlighting how it's a developing field that can give private sector banks a competitive edge and open up new business opportunities while also extending the authority of supervisors and central banks to safeguard the financial system and control the risks associated with specific financial institutions. Given that it impacts every economic sector, climate change is likely to pick up speed and is no longer just seen as an environmental danger. In addition, the banking industry is facing transitional and physical risks as a result of climate-related hazards.

Tan and Zhu (2022) examined the usefulness of environmental, social, and corporate governance (ESG) ratings and is frequently connected by researchers and professionals to the financial success of corporations. Assessing the fundamental connections between corporate green innovation (CGI) and ESG ratings in underdeveloped nations is one area of substantial untapped research. It analyses the quasi-natural experiment using data from Chinese A-share listed companies between 2010 and 2018, based on the 2015 ESG rating provided by the SynTao Green Finance Agency to analyze how ratings affect CGI. The findings demonstrate how financial restrictions are lessened and managers' environmental awareness is raised, mediating the substantial promotion of both the number and quality of CGI through ESG ratings.

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Hypothesis Formulation

Hypothesis 1 (H_1)

H_0: *There is no significant relationship between the level of green finance investments and environmental responsibility among financial institutions.*

H_1: *There is a positive and significant relationship between the level of green finance investments and environmental responsibility among financial institutions.*

Hypothesis 2 (H_2)

H_0: *The strength of the regulatory environment does not significantly impact the sustainable development practices of financial institutions.*

H_2: *A strong regulatory environment positively influences the sustainable development practices of financial institutions.*

Hypothesis 3 (H_3)

H_0: *There is no significant association between the extent of csr and the level of environmental responsibility in financial institutions.*

H_3: *Financial institutions with a higher degree of csr integration are more likely to exhibit a greater level of environmental responsibility.*

Hypothesis 4 (H_4)

H_0: *There is no significant relationship between the innovation in financial products and the overall sustainable development impact of financial institutions.*

H_4: *Financial institutions that embrace innovative financial products are more likely to contribute positively to sustainable development.*

RESEARCH METHODS

A quantitative cross-sectional study design is used in the research to look at the correlations between important factors. A quick examination of the relevant variables across a wide range of financial institutions is made possible by this approach. The goal of the research is to shed light on how green finance investments, the regulatory landscape, corporate social responsibility (CSR), and financial product innovation affect financial institutions' commitment to sustainable development and environmental responsibility. To choose a representative sample of 500 financial representatives, random selection will be used.

Data Collection

Surveys and structured questionnaires will be sent to the financial institutions. Through the use of these instruments, quantifiable data on investments in green finance, opinions on regulatory frameworks, corporate social responsibility (CSR), innovation in financial products, environmental responsibility, and sustainable development will be gathered. Ethical rules will ensure informed consent and confidentiality throughout the data collection process.

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Variables

Dependent Variables

1. Environmental Responsibility
2. Sustainable Development

Independent Variables

1. Green Finance Investments
2. Regulatory Environment
3. Corporate Social Responsibility (CSR)
4. Innovation in Financial Products

Statistical Analysis

Many statistical studies will be performed on the gathered data, including to investigate the links between variables, use correlation analysis. T-tests are used to evaluate significant differences and compare means. Regression analysis is used to assess the importance and strength of correlations. descriptive statistics to give a general picture of the features of the sample. The goal of this thorough statistical research is to provide light on the intricate interactions that exist between CSR, regulatory frameworks, innovation, green finance systems, and financial institutions' commitment to sustainable development and environmental responsibility.

ANALYSIS RESULTS

Sample of Respondens

Table 1 presents a comprehensive demographic profile of the participants in our research, elucidating crucial attributes such age, gender, educational background, monthly earnings, job title, work history, and degree of environmental consciousness. When it comes to age distribution, 40,6 percent of the sample, or the bulk of respondents, are between the ages of 26 and 35. The next large group, which makes up 35% of the responses, is people in the 36–45 age range. It is interesting that the age groups in our sample are divided pretty equally, with 9 percent of the sample falling into the 18–25 age group, 76% falling into the 46–55 age group, and 7,8% falling into the 56+ age group. Regarding gender, 32,6 percent of the respondents in our sample are female, and 67,4 percent of the total are male.

The respondents' educational backgrounds show that they are a well-educated sample; 43,6% of them have either a bachelor's or master's degree (36,6 percent). 10,8 percent of the surveyed group hold a doctorate or professional degree, indicating a high level of academic attainment. Nine percent of respondents said they only completed high school or less in terms of education. According to the monthly income distribution, 42,6 percent of respondents fell within the less than 25,000 and 25,000 - 50,000 income ranges, which is a sizable component of the sample (43,4 percent). The respondents' different economic backgrounds are shown by the diversity of income levels, which includes the groups of 50,001 - 75,000, 75,001 - 100,000, and more than 100,000. When looking at the jobs that respondents held, the category of Chief Financial Officers (CFOs) makes up the greatest portion of the sample, accounting for 26% of the total. According to the report, there is a preponderance of mid-level finance professionals: 25,6 percent are Finance Managers and 37,2 percent are Financial Analysts. With 25,4 percent identifying as Novice, 54,2 percent as Intermediate, and 20,4 percent as Advanced, the

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

respondents' experience levels are evenly spread. Respondents indicated varying degrees of environmental awareness: 42,4 percent identified as high, 44,4 percent as moderate, and 13,2 percent as low.

Table 1. Demographic Information

	Category	Frequency	Percentage
Age	18-25 years	45	9,0
	26-35 years	203	40,6
	36-45 years	175	35,0
	46-55 years	38	7,6
	56 and above	39	7,8
Gender	Male	337	67,4
	Female	163	32,6
Education qualification	High School or below	45	9,0
	Bachelor's degree	218	43,6
	Master's degree	183	36,6
	Doctorate or professional degree	54	10,8
Monthly Income	Less than 25,000	213	42,6
	25,000 - 50,000	217	43,4
	50,001 - 75,000	21	4,2
	75,001 - 100,000	28	5,6
	More than 100,000	21	4,2
Position	Chief Financial Officer (CFO)	130	26,0
	Finance Manager	128	25,6
	Financial Analyst	186	37,2
	Accountant	16	3,2
	Investment Analyst	25	5,0
	others	15	3,0
Experience	Novice	127	25,4
	Intermediate	271	54,2
	Advanced	102	20,4
Environment Awareness	Low	66	13,2
	Moderate	222	44,4
	High	212	42,4

Descriptive Statistics

Descriptive statistics for the major study variables are shown in table 2, which provide information about the responses' primary tendencies and variability among the 500 respondents. Regulatory Environment (RE), Green Finance Investments (GFI), Sustainable Development (SD), Environmental Responsibility (ER), Corporate Social Responsibility (CSR), and Innovation in Financial Products are some of these characteristics (IFP).

On a scale of 1 to 5, respondents gave Environmental Responsibility (ER) an average score of 4,0190; with a standard deviation (SD) of 0,74984. The mean score for Sustainable. Development (SD) is 3,9777; with a standard deviation of 0,74551; which is somewhat lower. The mean score for Green Finance Investments (GFI) is 3,9587; and the SD is 0,71561. The mean score for the Regulatory Environment (RE) variable is 3,9967; with a SD of 0,73383.

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

The SD is 0,74553 and the mean score is 3,9773 for corporate social responsibility (CSR). The mean score for Innovation in Financial Products (IFP) is 3,9583; while the standard deviation is 0,72904.

The descriptive statistics provide insightful information about the replies of the polled financial professionals, including their core tendencies and dispersion. Positive dispositions toward environmental responsibility, sustainable development, green finance investments, regulatory environment, corporate social responsibility, and innovation in financial products are shown by the comparatively high mean scores across variables in the sample. The standard deviations give more information by showing how much the participants' responses agreed or disagreed.

Table 2. Descriptive Statistics

	N	Mean	SD	Std. Error Mean
Environmental Responsibility (ER)	500	4,0190	0,74984	0,03353
Sustainable Development (SD)	500	3,9777	0,74551	0,03334
Green Finance Investments (GFI)	500	3,9587	0,71561	0,03200
Regulatory Environment (RE)	500	3,9967	0,73383	0,03282
Corporate Social Responsibility (CSR)	500	3,9773	0,74553	0,03334
Innovation in Financial Products (IFP)	500	3,9583	0,72904	0,03260

Reliability Statistics

Table 3 presents the findings of an internal consistency reliability analysis (Cronbach's Alpha) for a collection of 36 items. According to reports, the Cronbach's Alpha coefficient is 0,974 overall and rises to 0,975 when standardised items are taken into account. The Cronbach's Alpha values that have been recorded highlight the instrument's dependability and indicate that it is a good fit for accurately and consistently collecting the intended construct.

Table 3. Reliability Analysis

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0,974	0,975	36

T-test

The findings of a hypothesis test utilising t-tests for different variables are shown in table 4. For every variable, the test results, computed t-statistics, degrees of freedom (df), and corresponding p-values (Sig. 2-tailed) are provided. Interestingly, every p-value is very near to zero, indicating that the observed mean differences are very statistically significant. As a measure of the discrepancy between the observed and predicted means under the null hypothesis, the t-values are consistently high.

This suggests a significant departure from the zero values of the null hypothesis. The 95 percent confidence intervals surrounding the mean differences offer valuable information about the precision and extent of these discrepancies. All things considered, these findings indicate that the variables that are being examined—which include corporate social responsibility, sustainable development, green finance investments, environmental responsibility, and regulatory environment show statistically significant deviations from the values of the null hypothesis**.**

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Table 4. T-test

	Test Value = 0					
	t	df	Sig. (2-Tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
ER	119,849	499	0,000	4,01900	3,9531	4,0849
SD	119,306	499	0,000	3,97767	3,9122	4,0432
GFI	123,697	499	0,000	3,95867	3,8958	4,0215
RE	121,783	499	0,000	3,99667	3,9322	4,0611
CSR	119,292	499	0,000	3,97733	3,9118	4,0428
IFP	121,408	499	0,000	3,95833	3,8943	4,0224

Relationship between Environmental Responsibility and Green Finance Investments (H_1)

Table 5 presents the Pearson correlation coefficients between two variables: Green Finance Investments (GFI) and Environmental Responsibility (ER). With values ranging from -1 to 1, the correlation coefficient measures the magnitude and direction of the linear link between two variables. The Pearson correlation value in this instance is 0,845; which is noticeably strong between ER and GFI. As might be predicted, a correlation of 1,000 along the diagonal denotes a perfect correlation between each variable and itself. There is a significant positive association between ER and GFI, as indicated by the off-diagonal correlation of 0,845. This implies that there is a strong propensity for green finance investments to rise along with the degree of environmental responsibility, and vice versa.

Table 5. Correlation Analysis on H_1

		ER	GFI
Pearson Correlation	ER	1,000	0,845
	GFI	0,845	1,000

The findings of a regression model's analysis of variance (ANOVA) are shown in table 6. The regression model has a p-value of 0,000 and an extraordinarily high F-statistic of 1240,095; indicating that it is highly significant with a sum of squares of 200,181 and 1 degree of freedom. This suggests that the regression model's explanatory power over the unexplained variation is substantial. The residual variance inside the model is represented by the Residual Sum of Squares (SS), which is 80,389 with 498 degrees of freedom. There are 499 degrees of freedom and a total sum of squares of 280,570. The importance of the regression model in explaining the variability in the dependant variable is strongly supported by this ANOVA table 6. These results highlight the critical role that green finance investments play in encouraging environmental responsibility in financial institutions and highlight the relationship between sustainable practises and financial strategies.

Table 6. ANOVA Result on H_1

Model		SS	df	MS	F	Sig.
1	Regression	200,181	1	200,181	1240,095	0,000
	Residual	80,389	498	0,161		
	Total	280,570	499			

SS- Sum of squares, MS- Mean square

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Relationship between Sustainable Development and Regulatory Environment (H_2)

The pearson correlation coefficients between the Regulatory Environment and Sustainable Development (SD) are shown in table 7. (RE). As one might anticipate, a perfect correlation between every variable and itself is shown by a correlation coefficient of 1,000 along the diagonal. There is a significant positive connection between SD and RE, as indicated by the off-diagonal correlation of 0,836. This suggests that there is a significant tendency for a good impression of the Regulatory Environment to rise with the degree of Sustainable Development and vice versa.

Table 7. Correlation Analysis on H_2

		SD	RE
Pearson Correlation	SD	1,000	0,836
	RE	0,836	1,000

The results of an ANOVA for a regression model are shown in table 8. In this instance, the regression sums of squares with one degree of freedom, 193,814, is displayed by this model, which evaluates the connection between the variables. 193,814 is the mean square, which is calculated by dividing the total of squares by the degrees of freedom. The regression model is statistically significant, as indicated by the remarkably high associated F-statistic of 1155,646. The model's relevance is confirmed by the stated p-value (Sig.) of 0,000. With 498 degrees of freedom, the residual sum of squares is 83,520, which indicates unexplained variation. With 499 degrees of freedom, the total sum of squares is 277,334. The high F-statistic and low p-value indicate that, in general, the ANOVA findings strongly support the importance of the regression model.

Table 8. ANOVA Result on H_2

	Model	SS	df	MS	F	Sig.
1	Regression	193,814	1	193,814	1155,646	0,000
	Residual	83,520	498	0,168		
	Total	277,334	499			

Relationship between Environmental Responsibility and Corporate Social Responsibility (H_3)

The pearson correlation coefficients between corporate social responsibility (CSR) and environmental responsibility (ER) are shown in table 9. (CSR). A perfect connection between any two variables is shown by a correlation coefficient of 1,000 along the diagonal. ER and CSR are significantly positively correlated, as seen by the off-diagonal correlation of 0,758. This implies that there is a discernible trend for a higher degree of integration of Corporate Social Responsibility to rise with an increase in Environmental Responsibility, and vice versa.

Table 9. Correlation Analysis on H_3

		ER	CSR
Pearson Correlation	ER	1,000	0,758
	CSR	0,758	1,000

Table 10 displays the findings of a regression model's analysis of variance (ANOVA), which looks at the connection between the variables. With one degree of freedom, the regression sum of squares in this case is 161,017, resulting in a mean square of 161,017. The

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

regression model is highly significant according to the high F-statistic of 670,726 and the significantly low p-value (Sig. = 0,000). This implies that, in comparison to the unexplained variation, the variance explained by the model is significant. With 498 degrees of freedom, the residual sum of squares, or 119,552, represents the unexplained variance in the model. There are 499 degrees of freedom and a total sum of squares of 280,570. As seen by the high F-statistic and the extremely low p-value, the ANOVA findings, in summation, significantly support the importance of the regression model.

Table 10. ANOVA Result on H_3

	Model	SS	df	MS	F	Sig.
1	Regression	161,017	1	161,017	670,726	0,000
	Residual	119,552	498	0,240		
	Total	280,570	499			

Relationship between Sustainable Development and Innovation in Financial Products (H_4)

The pearson correlation coefficients between innovation in financial products and sustainable development (SD) are shown in table 11. (IFP). A complete connection between each variable and itself is shown by a correlation coefficient of 1.000 along the diagonal. A strong positive correlation exists between SD and IFP as indicated by the off-diagonal correlation of 0,767. This suggests that there is a discernible tendency toward greater levels of innovation in financial products when sustainable development levels rise, and vice versa.

Table 11. Correlation Analysis on H_4

		SD	IFP
Pearson Correlation	SD	1,000	0,767
	IFP	0,767	1,000

The findings of a regression model's analysis of variance (ANOVA), which looked at the connection between the variables, are shown in table 12. With one degree of freedom, the regression sum of squares is 162,965, which yields a mean square of 162,965. The regression model is highly significant, as evidenced by the high F-statistic of 709,598 and the substantially low p-value (Sig. = 0,000). This implies that, in comparison to the unexplained variation, the variance explained by the model is significant. With 498 degrees of freedom, the residual sum of squares, or 114,369, represents the unexplained variance in the model. 277,334 is the sum of all squares with 499 degrees of freedom. As seen by the high F-statistic and the extremely low p-value, the ANOVA findings, in summation, significantly support the importance of the regression model.

Table 12. ANOVA Result on H_4

	Model	SS	df	MS	F	Sig.
1	Regression	162,965	1	162,965	709,598	0,000
	Residual	114,369	498	0,230		
	Total	277,334	499			

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Discussion

In order to comprehend the complex linkages that exist inside financial institutions regarding green finance investments, regulatory settings, CSR integration, and the adoption of novel financial products, the study examined four main assumptions. First, the study showed strong support for Hypothesis 1, pointing to a considerable and positive correlation between financial organisations' environmental responsibility and their degree of green finance investments. This research emphasises how important financial support for sustainable projects is in encouraging environmental responsibility. Furthermore, there was a lot of empirical evidence to support Hypothesis 2, which states that sustainable development practises are positively impacted by a robust regulatory framework. The regression analysis's high degree of statistical significance highlights the importance of external regulatory considerations and suggests that sustainable growth strategies within financial institutions are greatly aided by a supportive regulatory environment.

The results of the study supported Hypothesis 3, which examined the relationship between environmental responsibility and CSR integration. The positive connection highlights the comprehensive nature of corporate responsibility activities in the financial industry by suggesting that financial organisations with higher levels of CSR integration are also more likely to demonstrate a higher level of environmental responsibility. The fourth and final hypothesis said that financial institutions that use cutting-edge financial products have a higher chance of favourably influencing sustainable development. The study's findings highlight the importance of innovation and indicate that organisations that adopt cutting-edge financial solutions typically have a closer alignment with goals related to sustainable development.

In conclusion, the study's conclusions offer insightful information on the intricate interactions that exist between financial tactics and social and environmental responsibility. The positive correlations that have been found highlight the potential of financial institutions to be key players in the advancement of sustainability. This includes not only making investments specifically in green finance, but also adhering to regulations, integrating CSR, and developing innovative financial products. The comprehension of how financial institutions might successfully support sustainable development goals is expanded by these findings.

CONCLUSION

To sum up, this cross-sectional study sheds light on the complex relationships that exist between sustainable development and green finance methods in encouraging financial firms to take an environmental duty. The strong and positive correlation between green finance investments and environmental responsibility highlights how important financial support is in encouraging environmentally friendly behaviour. Furthermore, the research substantiates the impact of a robust regulatory framework on sustainable development methodologies, providing valuable perspectives for policymakers who aim to mould ecologically aware conduct in the finance industry.

The results underscore the significance of a comprehensive approach to business operations and the critical role that Corporate Social Responsibility (CSR) integration plays in improving environmental responsibility. Furthermore, the favourable association shown between the adoption of pioneering financial goods and advancements in sustainable development implies opportunities for financial establishments to synchronise innovation with ecological goals. The aforementioned implications highlight the possibility of financial institutions taking the lead in promoting environmental responsibility and wider sustainable development objectives. This could lead to a reassessment of strategies and policies within the financial sector in anticipation of a future with greater environmental consciousness.

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

Implication

The cross-sectional study has important ramifications for policymakers and financial institutions alike by looking at how green financing and sustainable development mechanisms interact to promote environmental responsibility. The degree of green finance investments and environmental responsibility have been found to positively and significantly correlate, which highlights the critical role that financial commitment plays in encouraging environmentally conscious behaviour. Given the possible benefits to sustainable development, financial institutions eager to uphold their environmental responsibilities ought to think about investing more in green projects.

The premise that a robust regulatory framework has a favourable impact on sustainable development practises is validated by the study, highlighting the significance of regulatory frameworks in influencing the environmental behaviour of financial institutions. Using this knowledge, regulators and policymakers may create and execute laws that encourage and mandate environmentally friendly practises in the banking industry, supporting more general environmental objectives. Furthermore, there are important ramifications for business operations from the discovery that financial institutions that integrate Corporate Social Responsibility (CSR) more deeply are more likely to demonstrate better environmental responsibility. This implies that encouraging environmentally conscious conduct in financial institutions can be facilitated by a comprehensive approach to corporate responsibility that takes into account both social and environmental factors.

The study demonstrates the potential synergy between financial innovation and environmental responsibility by demonstrating the beneficial association between adopting new financial solutions and contributions to sustainable development. Financial institutions may be able to innovate financial solutions that support environmental aims and hence contribute significantly to sustainable development goals. Therefore, this study's findings highlight how complex it is to motivate environmental responsibility in the finance industry. These results may be used by stakeholders, financial institutions, and policymakers to create strategies, policies, and practises that support environmental sustainability as a whole while also being in line with sustainable development and environmental responsibility.

Declarations

Funding

On Behalf of all authors the corresponding author states that they did not receive any funds for this project.

Conflicts of Interest
The authors declare that we have no conflict of interest.

Competing Interests
The authors declare that we have no competing interest.

Data Availability Statement
All the data is collected from the simulation reports of the software and tools used by the authors. Authors are working on implementing the same using real world data with appropriate permissions.

E-ISSN: 2988-0211 | Vol. 02, No. 04, 2024, pp. 77-91 | DOI: 10.63901/ijebam.v2i4.70

REFERENCE

Arian, A., Sands, J. and Tooley, S. (2023) 'Industry and Stakeholder Impacts on Corporate Social Responsibility (CSR) and Financial Performance: Consumer vs. Industrial Sectors', *Sustainability*, 15(16), pp. 1–21. Available at: https://doi.org/10.3390/su151612254.

Cui, H., Wang, R. and Wang, H. (2020) 'An Evolutionary Analysis of Green Finance Sustainability based on Multi-Agent Game', *Journal of Cleaner Production*, 269(3). Available at: https://doi.org/10.1016/j.jclepro.2020.121799.

D'Orazio, P. (2023) 'Navigating financial stability through the dual challenges of climate change and pandemics', *Current Opinion in Environmental Sustainability*, 65, p. 101386. Available at: https://doi.org/10.1016/j.cosust.2023.101386.

Falcone, P.M. and Sica, E. (2019) 'Assessing the Opportunities and Challenges of Green Finance in Italy: An Analysis of the Biomass Production Sector', *Sustainability*, 11(2), pp. 1–14. Available at: https://doi.org/10.3390/su11020517.

Gangi, F. *et al.* (2019) 'Sustainable Development and Corporate Governance in the Financial System: Are Environmentally Friendly Banks Less Risky?', *Corporate Social Responsibility and Environmental Management*, 26(3), pp. 529–547. Available at: https://doi.org/10.1002/CSR.1699.

Gregory, R.P., Stead, J.G. and Stead, E. (2021) 'The global pricing of environmental, social, and governance (ESG) criteria', *Journal of Sustainable Finance & Investment*, 11(4), pp. 310–329. Available at: https://doi.org/10.1080/20430795.2020.1731786.

Guang-Wen, Z. and Siddik, A.B. (2022) 'Do Corporate Social Responsibility Practices and Green Finance Dimensions Determine Environmental Performance? An Empirical Study on Bangladeshi Banking Institutions', *Frontiers in Environmental Science*, 10, pp. 1–14. Available at: https://doi.org/10.3389/fenvs.2022.890096.

Hadaś-Dyduch, M. *et al.* (2022) 'Green Bonds as an Instrument for Financing Ecological Investments in the V4 Countries', *Sustainability*, 14(19), pp. 1–48. Available at: https://doi.org/10.3390/su141912188.

Hariram, N.P. *et al.* (2023) 'Sustainalism: An Integrated Socio-Economic-Environmental Model to Address Sustainable Development and Sustainability', *Sustainability*, 15(13), pp. 1–37. Available at: https://doi.org/10.3390/su151310682.

Hsu, C.-C. *et al.* (2021) 'Evaluating Green Innovation and Performance of Financial Development: Mediating Concerns of Environmental Regulation', *Environmental Science and Pollution Research*, 28(40), pp. 57386–57397. Available at: https://doi.org/10.1007/s11356-021-14499-w.

Iacobuţă, G.I. *et al.* (2022) 'Aligning Climate and Sustainable Development Finance Through an SDG Lens. The Role of Development Assistance in Implementing the Paris Agreement', *Global Environmental Change*, 74, pp. 1–12. Available at: https://doi.org/10.1016/j.gloenvcha.2022.102509.

Kwilinski, A., Lyulyov, O. and Pimonenko, T. (2023) 'Spillover Effects of Green Finance on Attaining Sustainable Development: Spatial Durbin Model', *Computation*, 11(10), pp. 1–13. Available at: https://doi.org/10.3390/computation11100199.

Liang, H. and Renneboog, L. (2020) *Corporate Social Responsibility and Sustainable Finance: A Review of the Literature*, *European Corporate Governance Institute – Finance*

Working Paper. Available at: https://doi.org/10.2139/ssrn.3698631.

Liu, Y., Lei, J. and Zhang, Y. (2021) 'A Study on the Sustainable Relationship among the Green Finance, Environment Regulation and Green-Total-Factor Productivity in China', *Sustainability*, 13(21), pp. 1–27. Available at: https://doi.org/10.3390/su132111926.

Ma'ruf, A., Mahomed, Z. and Mohamad, S. (2021) 'Sustainable Finance and a Sharī' Analysis of Environmental, Social and Governance (ESG) Criteria', in *Islamic Finance and Sustainable Development*. Cham: Springer International Publishing, pp. 193–217. Available at: https://doi.org/10.1007/978-3-030-76016-8_9.

Madaleno, M., Dogan, E. and Taskin, D. (2022) 'A step Forward on Sustainability: The Nexus of Environmental Responsibility, Green Technology, Clean Energy and Green Finance', *Energy Economics*, 109, p. 105945. Available at: https://doi.org/10.1016/j.eneco.2022.105945.

Monk, A. and Perkins, R. (2020) 'What Explains the Emergence and Diffusion of Green onds?', *Energy Policy*, 145, pp. 1–13. Available at: https://www.sciencedirect.com/science/article/pii/S030142152030375X.

Park, H. and Kim, J.D. (2020) 'Transition Towards Green Banking: Role of Financial Regulators and Financial Institutions', *Asian Journal of Sustainability and Social Responsibility*, 5(5), pp. 1–25. Available at: https://doi.org/10.1186/s41180-020-00034-3.

Saeed, M.M., Mudliar, M. and Kumari, M. (2023) 'Corporate Social Responsibility and Financial Performance Nexus: Empirical Evidence From Ghana', *Corporate Social Responsibility and Environmental Management*, 30(6), pp. 2799–2815. Available at: https://doi.org/10.1002/csr.2516.

Setyowati, A.B. (2023) 'Governing Sustainable Finance: Insights From Indonesia', *Climate Policy*, 23(1), pp. 108–121. Available at: https://doi.org/10.1080/14693062.2020.1858741.

Streimikiene, D. and Kaftan, V. (2021) 'Green Finance and The Economic Threats During COVID-19 Pandemic', *Terra Economicus*, 19(2), pp. 105–113. Available at: https://doi.org/10.18522/2073-6606-2021-19-2-105-113.

Tan, Y. and Zhu, Z. (2022) 'The Effect of ESG Rating Events on Corporate Green Innovation in China: The Mediating Role of Financial Constraints and Managers' Environmental Awareness', *Technology in Society*, 68, pp. 1–13. Available at: https://doi.org/10.1016/j.techsoc.2022.101906.

Udeagha, M.C. and Ngepah, N. (2023) 'The Drivers of Environmental Sustainability in BRICS Economies: Do Green Finance and Fintech Matter?', *World Development Sustainability*, 3(1), pp. 1–16. Available at: https://doi.org/10.1016/j.wds.2023.100096.

Ye, J. *et al.* (2022) 'The Nexus among Green Financial Development and Renewable Energy: Investment in the Wake of The Covid-19 Pandemic', *Economic Research-Ekonomska Istraživanja*, 35(1), pp. 5650–5675. Available at: https://doi.org/10.1080/1331677X.2022.2035241.

Zhou, X., Tang, X. and Zhang, R. (2020) 'Impact of Green Finance on Economic Development and Environmental Quality: a Study Based on Provincial Panel Data from China', *Environmental Science and Pollution Research*, 27(16), pp. 19915–19932. Available at: https://doi.org/10.1007/s11356-020-08383-2.