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Does the Financial and Innovation Performance of European and Asian–Oceanian Companies Coincide with the Targets of the Green Deal?

Raminta Vaitiekuniene [1,*], Kristina Sutiene [1], Bohdan Kovalov [2] and Rytis Krusinskas [3]

[1] Department of Mathematical Modeling, Kaunas University of Technology, Studentu 50, 51368 Kaunas, Lithuania; kristina.sutiene@ktu.lt
[2] Department of Economics, Entrepreneurship and Business Administration, Sumy State University, Kharkivska Str., 116, 40007 Sumy, Ukraine; b.kovalov@econ.sumdu.edu.ua
[3] Sustainable Economics Research Group, Kaunas University of Technology, Gedimino 50, 44249 Kaunas, Lithuania; rytis.krusinskas@ktu.lt
* Correspondence: raminta.vaitiekuniene@ktu.lt

Abstract: The Paris Agreement, signed in 2015 and put into effect in 2016, led to the European Green Deal. It envisages ensuring climate neutrality by 2050. To achieve this, solutions to the climate challenge have to be implemented globally. This research aims to evaluate interactions among corporate financial, innovation, and environmental performance indicators in European and Asian–Oceanian companies. Financial performance refers to the financial capacity and financial resources of companies that enable the creation of more sustainable innovations. More sustainable innovation could contribute to limiting global warming to 1.5 °C. Science indicates that global greenhouse gas emissions need to be cut down by 43% by 2030, compared to 2019 levels, to limit global warming to 1.5 °C. According to our results, it is possible to compare which region, Europe or Asia, moved towards climate neutrality in the analyzed period of 2008–2019. By determining their starting positions, we seek to disclose how companies can contribute to climate change reduction. The results reveal that for both analyzed regions, financial and innovation indicators have an important impact on environmental performance. We found that the ROA ratio and R&D expenditures are significantly linked to carbon dioxide (CO_2) emissions as an indicator of environmental performance. The interaction between ROA and CO_2 emissions was identified as being stronger in Asia–Oceania. The relationship between R&D expenditures and CO_2 emissions was more robust in Europe. Therefore, Europe is participating in the race towards sustainable goals by increasing R&D expenditures to stimulate green economy development. In the race to achieve the Green Deal's long-term 2050 targets, companies will have to combine their strategic decisions, while business survival requires profitability, meaning that the race towards climate neutrality goals will hardly be possible without corporate R&D expenditures.

Keywords: financial performance; innovation performance; environmental performance; Green Deal implementation

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Citation: Vaitiekuniene, R.; Sutiene, K.; Kovalov, B.; Krusinskas, R. Does the Financial and Innovation Performance of European and Asian–Oceanian Companies Coincide with the Targets of the Green Deal? *Sustainability* **2024**, *16*, 1485. https://doi.org/10.3390/su16041485

Academic Editor: Wen-Hsien Tsai

Received: 13 December 2023
Revised: 25 January 2024
Accepted: 31 January 2024
Published: 9 February 2024

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1. Introduction

The financial and innovation results of companies and the pursuit of climate neutrality are closely related, forming a complex phenomenon. Both investors and market participants value the application of good practices by companies without harming the climate. This also affects the prices of company shares, investors' expectations, and market forecasts. Companies that firmly strive for sustainability, adapt green innovations in their operations, solve climate change-related problems, and do all of this with a long-term perspective are increasingly attracting more interest from investors. This results in an additional premium to the share prices of these companies. The significance of these findings is also

notable when considering the potential rise in financial institutions' involvement with environmentally friendly businesses as a result of policy measures implemented to address climate change [1].

On the other hand, the transition to a climate-neutral environment can be costly for companies. These companies incur higher capital costs because it is expensive to implement renewable energy sources and energy-saving technologies. It usually requires large initial investments, which only pay off much later. A decrease in energy costs and an increase in resource efficiency and operational productivity would enable the payback of these investments. Companies that are determined to firmly pursue climate neutrality goals additionally face financial risks due to higher operational costs, legal challenges, and fines if environmental requirements are violated. Companies will only begin to reap financial benefits when innovations are introduced, new solutions are created, regulations are met, and new sustainable products and services are offered to the market. Until then, it is an additional financial burden for companies. Environmentally friendly products and services open up new markets and generate new, higher cash flows, but consumers must clearly see the difference to be willing to pay more. As consumers increasingly trust a company's operations, products, and services, the market opportunities for these companies increase. Sustainability goals will be achieved when all links in the supply chain contribute to long-term sustainability goals. These long-term sustainability goals may include clean energy, a circular economy, or sustainable innovation. However, there are many risk factors in these areas that are related to additional financial risks for companies. It is, therefore, essential that all links in the supply chain equally understand the need for sustainability goals and treat them as a priority. Thus, gaining better access to capital, specialized financing options, and better financial results depends on companies' commitment to climate neutrality regarding their consumers, society, and suppliers. Collectively, this will have a positive impact towards a more sustainable future and financial results that will improve investment capacity.

Climate change is an important issue, and because of this, the Paris agreement was signed in 2016 by 196 countries. However, the target of slowing global warming is not pursued uniformly by all of these countries. The main goal of the European Green Deal is to achieve climate neutrality by 2050, and this must be achieved through different important components, such as economic, social, and environmental sustainability. The Green Deal aims for economic sustainability, human well-being, and environmental efficiency. Sustainability has become increasingly important in Europe and internationally [2]. Sustainability refers to a long-term process towards achieving a long-term level of well-being and development [3]. Europe is taking decisive measures to implement sustainability, especially regarding the environment, and has confirmed and further strengthened its commitment to full decarbonization through the European Green Deal and the 'Fit for 55' package [4]. It is estimated that in order to achieve sustainable goals by 2030, it will be necessary to invest EUR 260 billion per year, which requires 1.94% of the EU's annual gross domestic product according to the 2020 level [5]. It is also clear that the climate crisis is an international problem, not only within Europe, which requires coordinated action from all regions and countries of the world [6]. Innovation that is sustainable, clean, and advanced has a significant impact on achieving these goals [7]. Innovation means a better technological solution that more effectively meets the needs of society [8,9].

We collected data on companies not just from Europe, but also from the Asia–Oceania region, in order to verify the relationships among their financial, innovation, and environmental performance. We have chosen to analyze environmental performance, as one of the most important goals of the Green Deal, in relation to clean business activities, especially clean energy, because this is one area where significant climate impacts can be made. Large-scale energy production and use affects greenhouse gas emissions in all countries. Promoting clean energy in companies' activities is a priority in the implementation of the Green Deal. The energy sector and road transport [8] are the largest consumers of fossil fuels, so fundamental reforms are particularly important. Solar power plants, heat pumps,

solar collectors, cogeneration power plants, storage tanks, electric vehicles, green cars, and vans [9] are necessary as a basis for companies to achieve clean energy, but this still requires strategic solutions, financial resources, and the availability of innovations (i.e., research and experimental expenditures). Therefore, we decided to evaluate the innovation performance of companies and its impact on their environmental performance in the same way. Financial performance is another important dimension in moving toward the implementation of the Green Deal. The use of clean energy, the purchase of durable supplies and materials, and the development of sustainable products and services depend on financial resources [9]. Sufficient financial resources enable companies to allocate part of their financial resources to the creation and adaptation of more sustainable innovations in products and services [9]. Therefore, financial resources, be it the company's own funds or borrowed funds, enable the movement towards a cleaner environment through the use of more sustainable products and services.

The basis of this research is the financial, innovation, and environmental performance of companies in European and Asian–Oceanian regions. Despite the different regions, all countries should manage the three main aspects of the world's energy trilemma—energy affordability and availability, energy security, and environmental sustainability—to create a solid foundation for prosperity and competitiveness [9]. This depends on the activities of the companies. Therefore, the main goal of this research is to assess the financial and innovation performance of companies and their relationship with environmental performance. We analyzed companies in Europe and Asia–Oceania that disclosed all relevant data. We also performed regression analysis to determine which indicators significantly influence environmental pollution.

2. Literature Review

Strategic environmental, social, and economic tasks and their mutual coordination with standard business practices to make a profit are increasingly becoming a part of the everyday life of companies. Consumers, investors, competitors, and all other market participants are carefully monitoring the transformation of companies from normal business activities to environmentally friendly processes and are choosing those products and services that are more sustainable and do not pollute the environment. Therefore, aligning business strategies with long-term sustainability goals is necessary to achieve a sustainable global economy and favor drivers [10,11]. Companies themselves can set strategic sustainability goals, including single or complex environmental, social, and economic goals, and incorporate them into day-to-day business activities. Despite the specifics of different operating sectors and companies, financial opportunities, and consumer needs, responsible business practices generally contribute to environmental protection, social responsibility, and economic resilience. These common corporate sustainability goals encourage the development of responsible business practices and set an excellent example for other companies just starting to move towards sustainability. One of the most important tasks for achieving strategic sustainability goals is the reduction in carbon dioxide emissions, greater use of renewable energy in production processes, the optimization of resources, reduction in waste, the inclusion of green finance and investments in the company's financing processes, financial resilience, and the promotion of innovation.

When companies balance their greenhouse gas (GHG) emissions with GHG equivalents by eliminating or offsetting emissions, they meet climate-neutral goals. Climate-neutral means carbon neutral. This is one of the main goals for mitigating climate change and reducing the overall impact of corporate activities on the entire climate system in the long term. Balancing greenhouse gas emissions in companies requires a complex approach, innovative solutions, complex processes, continuous improvement of business sectors, and adaptation to market changes. Implementation reports of long-term corporate strategies, including financial indicators and integrated sustainability goals, show the company's goals and their (non) fulfilment. How companies contribute to the realization of a neutral climate depends on the companies' sustainability practices and various initiatives related

to sustainability. Waste reduction in production processes, waste sorting and recycling, ecological supply chains, more sustainable products, and packaging are closely related to corporate sustainability practices. Greater consumer trust goes to those companies that publicize their sustainability practices and inform the public about the goals they have achieved. Greater trust enables more significant revenue by expanding product turnovers. Actual corporate sustainability practices are the basis for achieving climate neutrality goals.

When analyzing climate neutrality, it is essential to analyze greenhouse gas emissions from different aspects, as three types of emissions can be distinguished. According to this, companies also divide their emissions into three areas [12,13]:

Scope 1: Direct emissions from own or controlled sources (fuel combustion);

Scope 2: Indirect emissions from purchased electricity, heating, or cooling;

Scope 3: Indirect emissions from the entire value chain, including suppliers, customers, and product life cycles.

Some companies aim for zero greenhouse gas emissions from the atmosphere, which means completely eliminating all emissions. However, it is difficult for companies to achieve this; it requires a lot of financial capacity and human resources, especially for companies in the industrial sector and small- and medium-sized companies. Therefore, some companies choose activities that actively remove greenhouse gases from the atmosphere (direct air collection or enhanced air exposure). Companies balance their emissions with the equivalent amount of emissions removed or offset. This allows for some residual emissions as long as they are offset. It also includes investments in projects or activities that reduce or capture the equivalent amount of greenhouse gases to offset emissions. Joint offsetting projects can include reforestation, renewable energy, and methane capture initiatives.

Increasing the share of renewable energy in production and improving energy efficiency are essential tasks in corporate sustainability activities. This requires reducing fossil fuels and increasing renewable energy sources. The new ratio could reduce dependence on fossil fuels. Energy-saving technologies can help reduce energy consumption. Lower energy consumption enables lower emissions, respectively. The green transition from traditional production to an environmentally friendly strategy is a comprehensive company solution. This decision requires the involvement of all employees.

The global climate goals are to limit temperature rise to below 2 degrees Celsius compared to pre-industrial levels [12–14]. Companies are aiming to meet the global climate goals because they are scientifically based. Certification programs are in place to achieve this goal. A carbon neutrality certificate indicates that a company has achieved a level of carbon neutrality. Certification programs often include rigorous emissions assessment, offset measures, and sustainability efforts.

Implementation reports of sustainability indicators are integrated into annual financial statements, and their presentation and transparent disclosure of information are already becoming common practices. Soon, all companies will have to fill in and submit such reports regardless of sector, size, and financial capacity. Corporate responsibility and progress towards climate neutrality can be adequately assessed through transparent sustainability reports. Therefore, the methodology for accounting for greenhouse gas emissions must be understood similarly in all companies.

The climate crisis is not only a European problem but an international issue that requires effective measures in the long term. All regions of the world must focus on finding a solution and must share the united opinion that this problem needs to be solved.

Different international and national organizations provide initiatives to improve environmental sustainability, but individual initiatives alone cannot solve the global pollution problem. For example, the New European Bauhaus (NEB) is an interdisciplinary initiative that connects sustainability issues to people's everyday lives [10]. A common strategy that unites societies, businesses, and governments can provide better positive results for sustainability. In order to improve the sustainability of companies, a quick and successful transition to new business models is necessary [15].

The European Commission has taken action to solve the climate crisis and approved the Green Deal in 2020. The Green Deal covers three main dimensions of sustainability: economic sustainability, the well-being of people, and environmental performance at the company, national, and international levels [16]. Sustainability is one of the most critical challenges of our time [17]. Each sustainability component has essential goals, objectives, methodologies, and desired outcomes. The jointly achieved goals will implement the Green Deal. In this paper, we discuss each of these components in detail. Economic growth without using fossil resources and developing companies without polluting the environment is the basis of economic sustainability. Improving human health, achieving a more significant social life, and solving poverty are the main goals for the well-being of people. Business activities also affect the well-being of people. Long-term company social responsibility and operational transparency affect society's and employees' well-being [18]. Greenhouse gas emissions are a critical factor in environmental performance. Controlling carbon dioxide emissions is particularly important for sustainable growth [19]. Innovation, especially clean, sustainable, and green innovation, has become essential in this process. Innovation is essential for sustainable growth by improving energy efficiency both at the level of companies and countries [20]. Business activities, approaches to sustainability issues, and strategic decisions determine the direction of sustainability.

Creating or acquiring innovations and transforming activities from being environmentally polluting to green requires time, financial, and human resources. Financial capability, adequate technical support, previous experience, and business strategy influence technology adoption [21]. All this increases the costs of companies and enables the risk of competitiveness. However, higher innovation efficiency can increase the cost–output ratio and affect sustainable profit growth [22]. In any case, it is necessary to assess sustainable financial growth [23], and transformation requires extensive reforms [24]. In general, the issue of sustainability is a complex, multifactorial process. The sustainability problem is a serious challenge for the world [25]. Nevertheless, economic growth, reducing pollutant emissions, increasing green energy, and improving people's health have been consistently implemented since 2019 and will continue until 2050, according to the obligations of the Green Deal. The role of companies in this entire process is particularly significant regardless of the characteristics of the companies. Some companies adapt more quickly to changing market conditions. The company's age, the manager's experience, the specifics of the sector, financial resources, consumer needs, or environmental laws can determine the flexibility of the adaptation. More and more consumers are concerned about the ecological value of products because they are concerned about sustainability [26]. Sustainability crucially enables conducive sustainable growth for companies from the industrial and property sectors, but not from the agro and food industries [27].

Companies should consider at least one pillar of sustainability to contribute to implementing the Green Deal objectives. Few research studies have empirically examined all three pillars of sustainability [28]. Therefore, we aim to evaluate companies' environmental, financial, and innovation performance and connections. Climate change requires the involvement of both companies and society, especially the activities of companies. Although sustainability is becoming increasingly important to society [29] and sustainability assessments provide a vision for a sustainable society [30], companies must be key players in environmental innovation and accelerating sustainability change [31]. Creating, producing, and introducing green innovations to the market requires corporate investment, capacity, and human resources. This again requires a company strategy, the responsibility of the directors, time to implement investment projects, and additional costs. The transition of companies from fossil fuels to clean energy is not easy, so not all are ready to contribute to implementing the Green Deal. Risk factors, such as insufficient financial resources, indecisive management decisions, lack of employees, disrupted supply chains, or a weak legal framework, threaten companies' activities. Many companies face significant financial constraints [32]. It is necessary to investigate whether companies are ready to contribute to implementing the Green Deal [33] because shareholders have a decisive influence on

the company's environmental performance. In addition, sustainable entrepreneurship contributes to sustainable development by achieving synergies among social, environmental, and economic outcomes [34].

The climate crisis is a global problem that requires society's and companies' focus. The European Commission approved the Green Deal, which aims for economic sustainability, human well-being, and environmental efficiency. Economic growth without using fossil resources in companies is the basis of economic sustainability. Research concludes that reducing greenhouse gas emissions is critical to achieving climate neutrality. Therefore, we evaluated the combination of companies' financial, innovation, and environmental performance to investigate which factors influence carbon dioxide emissions and how strongly.

The research methodology to investigate the financial, innovation, and environmental performance of companies and their relationships is provided in the following section.

3. Methodology

This research focuses on the assessment of environmental sustainability. The research framework is provided in Figure 1. Six essential stages were included in the research framework. The identification of indicators based on financial, innovation, and environmental performance in companies formed the first stage of the research framework. Data collection from the European and Asian–Oceanian regions occurred in the second stage. Europe is one of the leaders in achieving the goals of the Green Deal; however, it is important not to forget other regions because the world is one and the issue of environmental sustainability is global. Both Europe and Asia–Oceania are important regions for climate neutrality. Therefore, in this research, the results of the regression models developed in the third stage are generated from both the European and Asia–Oceania regions. However, it is very important to compare the regions with each other, so we created regression models only from the data of European companies in the fourth step. We built regression models only from Asian–Oceanian company data in the fifth step. In total, we collected 12,025 observations from companies in the European and Asian–Oceanian regions over 12 years from 2008 to 2019. The data were collected from the Orbis and Thomson Reuters databases. Companies were selected from the following sectors: agriculture, forestry, fishing, mining, construction, manufacturing, transportation, public utilities, wholesale trade, retail trade, and services. These sectors affect climate change the most. In total, 2958 joint stock companies were included in this research.

Companies' financial performance can significantly impact their environmental performance, as profit enables the creation of innovation that reduces environmental pollution, and capital increases innovation possibilities. Positive financial results directed to the expenditures of research and experimental development can create a stronger effect in reducing environmental pollution. In addition, companies that invest in environmental issues suffer from increased operating costs [35]. Therefore, the financial and innovation performance of companies are examined together in this research. Financial and innovation performance indicators are independent variables that can influence environmental performance (dependent variable) (see Table 1). The indicators were selected to systematize studies that have examined financial performance, innovation, and sustainability dimensions (economic, social, and environmental sustainability) [36–38].

Environmental performance is the dependent variable that reveals the carbon dioxide emissions of companies and is calculated as CO_2 equivalent direct emissions (Scope 1) divided by market capitalization multiplied by 1000. Market capitalization is an indicator obtained by multiplying the number of shares of a company by the price of one share. Ordinary least squares (OLS) regression is a commonly used method [39–43] for estimating coefficients in linear regression equations. The OLS method is often used [44,45] in research that aims to assess the connections among environmental sustainability, innovation, and company performance indicators.

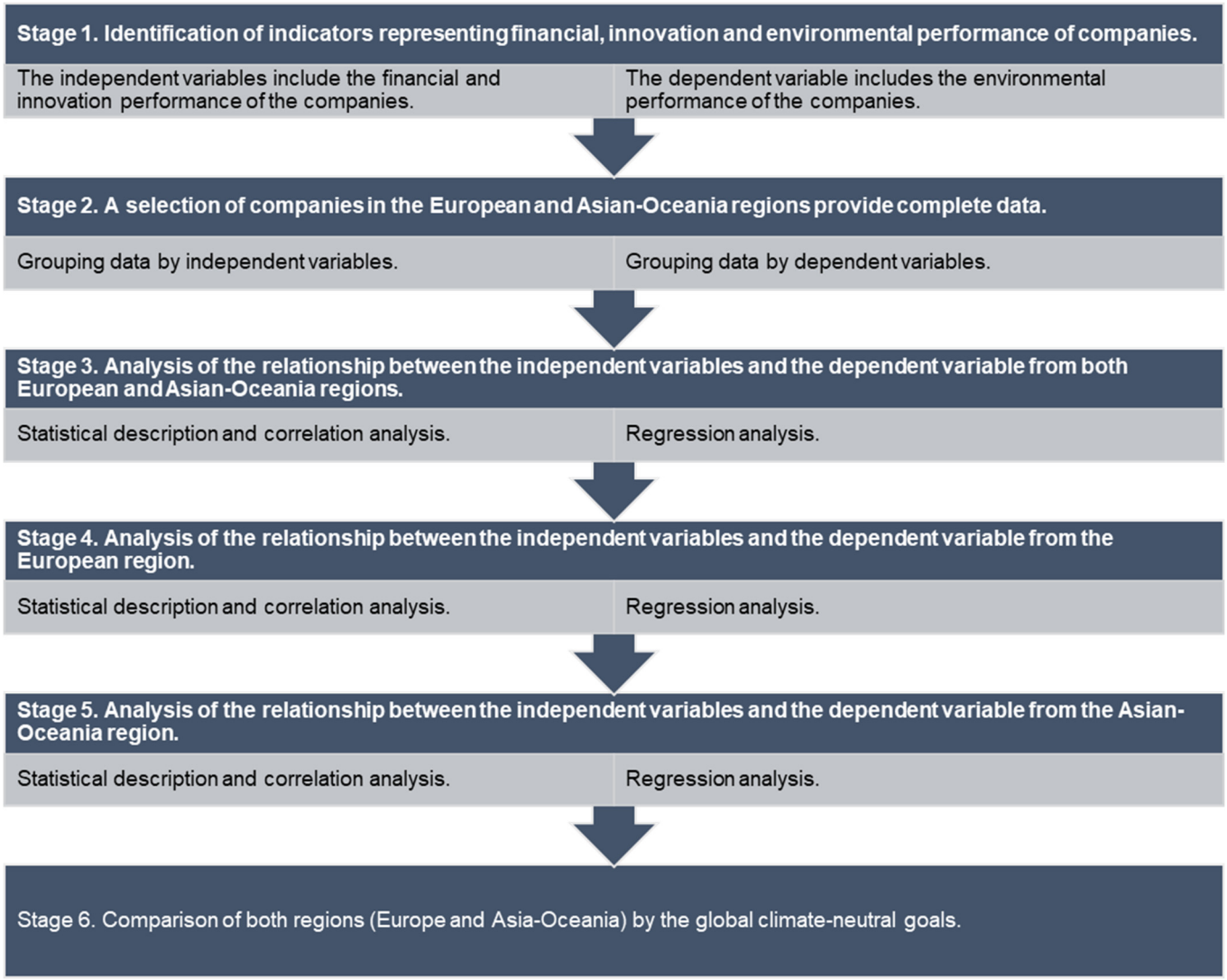


Figure 1. Framework of the research.

Table 1. Description of the independent and dependent variables (by [36–38]).

Part of Performance	Name of Ratio	Abbreviation	Formula
Financial performance	Company size	Size	ln(assets)
	Leverage	Leverage	((long-term debt + short-term debt)/assets)
	Tobin q	Tobin q	((assets + (market capitalization × 1000) − common equity))/assets
	Return on Assets	ROA	(net income/assets)
	Profitability	Profitability	sales/net income
Innovation performance	Research and development (R&D) expenditures	R&D	R&D expenditures/assets
Environmental performance *	Environmental performance	ENV	(CO_2 Equivalent Emissions Direct, Scope 1 /(mcap_usd × 1000))

* Dependent variable.

We performed the Breusch–Pagan/Cook–Weisberg test and the Hausman test. The null hypothesis for the Breusch–Pagan/Cook–Weisberg test was rejected, as the test statistic of the chi square was 28,222, which was statistically significant at the 1 percent level. Therefore, we added that the standard errors (in parentheses under the estimated regression

coefficients) are robust for heteroskedasticity and clustered at the firm level (in all regression models). Additionally, the null hypothesis of the Hausman test was rejected. The Hausman test indicated that the model requires fixed effects. Therefore, in the regression models, we included the country, industry, and year-fixed effects in all our regression models. We created regression equations to make it clearer what fixed effects we included. Our regressions included the firm and year-fixed effects because there may not be a large variation in the environmental performance across years.

Ordinary least squares (OLS) regression models were created according to the following formulas. In this research, different models were developed to evaluate the interactions of separate indicators and their interaction with corporate environmental performance. We propose six different OLS regression models, including different variables, to estimate the relationships and their strength among the included variables.

Model 1 measures whether financial performance (company size, leverage, Tobin q, and return on assets) affects environmental performance (carbon emissions). Model 2 estimates whether financial performance (company size, leverage, Tobin q, and return on assets), together with innovation performance (research and development expenditures), affects environmental performance (carbon emissions). Model 3 evaluates whether financial performance (company size, leverage, return on assets) affects environmental performance (carbon emissions). Model 4 measures whether financial performance (company size, leverage, Tobin q, and return on assets), innovation performance (research and development expenditures), the interaction of research and development expenditures, and profitability affect environmental performance (carbon emissions). Model 5 assesses whether financial performance (company size, leverage, Tobin q, and return on assets), and the interaction of research and development expenditures and profitability affect environmental performance (carbon emissions). Model 6 estimates whether financial performance (company size, leverage, return on assets), innovation performance (research and development expenditures), the interaction of research and development expenditures, and profitability affect environmental performance (carbon emissions).

$$\begin{aligned}\text{Environmental Performance}_{it(\text{Model 1})} &= a + \beta_1 \text{Size}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{Tobinq}_{it} + \beta_4 \text{ROA}_{it} \\ &+ \sum \text{Country F.E.} + \sum \text{Industry F.E.} + \sum \text{Year F.E.} + u_{it}\end{aligned} \quad (1)$$

$$\begin{aligned}\text{Environmental Performance}_{it(\text{Model 2})} &= a + \beta_1 \text{Size}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{Tobinq}_{it} + \beta_4 \text{ROA}_{it} + \beta_5 \text{R\&D}_{it} \\ &+ \sum \text{Country F.E.} + \sum \text{Industry F.E.} + \sum \text{Year F.E.} + u_{it}\end{aligned} \quad (2)$$

$$\begin{aligned}\text{Environmental Performance}_{it(\text{Model 3})} &= a + \beta_1 \text{Size}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{ROA}_{it} \\ &+ \sum \text{Country F.E.} + \sum \text{Industry F.E.} + \sum \text{Year F.E.} + u_{it}\end{aligned} \quad (3)$$

$$\begin{aligned}\text{Environmental Performance}_{it(\text{Model 4})} &= a + \beta_1 \text{Size}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{Tobinq}_{it} + \beta_4 \text{ROA}_{it} + \beta_5 \text{R\&D}_{it} + \beta_6 \text{R\&DxProfitability}_{it} \\ &+ \sum \text{Country F.E.} + \sum \text{Industry F.E.} + \sum \text{Year F.E.} + u_{it}\end{aligned} \quad (4)$$

$$\begin{aligned}\text{Environmental Performance}_{it(\text{Model 5})} &= a + \beta_1 \text{Size}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{Tobinq}_{it} + \beta_4 \text{ROA}_{it} + \beta_5 \text{R\&DxProfitability}_{it} \\ &+ \sum \text{Country F.E.} + \sum \text{Industry F.E.} + \sum \text{Year F.E.} + u_{it}\end{aligned} \quad (5)$$

$$\begin{aligned}\text{Environmental Performance}_{it(\text{Model 6})} &= a + \beta_1 \text{Size}_{it} + \beta_2 \text{Leverage}_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{R\&D}_{it} + \beta_5 \text{R\&DxProfitability}_{it} \\ &+ \sum \text{Country F.E.} + \sum \text{Industry F.E.} + \sum \text{Year F.E. } u_{it}\end{aligned} \quad (6)$$

where:

- Size is the size of the company;
- Leverage is the ratio between a company's debt and assets;

- Tobin's q is the ratio between the market value of the company's assets and its intrinsic value;
- ROA is the return on assets;
- Profitability is the ratio between the company's revenue and profit;
- R&D is the expenditure of research and experimental development;
- Environmental Performance is the ratio between a company's carbon dioxide emissions and market capitalization;
- 'i' indicates selected countries, 't' indicates the period from 2008 to 2019, and 'u_{it}' is a random disturbance term that is assumed to have zero mean and is homoscedastic and mutually uncorrelated at time 't'.

Also, due to the number of observations varying across sample countries, we performed weighted least squares (WLS) models, where the weight is the inverse of the country-level number of observations. We also compared the OLS and WLS models.

Following the established methodology, the research results based on the data collected from the European and Asian–Oceanian regions are provided in the following section. Based on the developed regression models, a comparative analysis between the regions was performed.

A statistical description of the variables is provided in Table 2. We collected 12,025 observations from companies in the European and Asian–Oceanian regions. The research data sample consists of 12 years, from 2008 to 2019. The data were collected from the Orbis and Thomson Reuters databases. The indicators of companies (such as size, leverage, Tobin q, and ROA) represent financial performance and are included as independent variables in the regression model. R&D expenditure reflects the innovation performance of companies as an independent variable in the regression model.

Table 2. Statistical description of companies from European and Asian–Oceanian regions.

Variable	N	Mean	p50	Standard Deviation	Min	Max
Size	12,025	15.5249	15.5052	1.4585	9.4930	18.6261
Leverage	12,025	0.2517	0.2425	0.1614	0	0.7776
Tobin q	12,025	1.7743	1.3546	1.3894	0.5453	12.2328
ROA	12,025	0.0766	0.0693	0.0864	−0.5454	0.4184
R&D	12,025	0.0147	0.0005	0.0311	−0.00005	0.5703
R&D and profitability	12,025	0.0009	0	0.0666	−3.1307	4.0617
Environmental performance	12,025	0.3654	0.0165	1.1465	0.00001	7.6134

A total of 7419 observations were collected from companies in the European region. The data sample consists of the same period of 12 years, from 2008 to 2019. A descriptive statistic of the variables from the European region is provided in Table 3.

Table 3. Statistical description of companies from the European region.

Variable	N	Mean	p50	Standard Deviation	Min	Max
Size	7419	15.3951	15.2722	1.5113	10.1273	18.7099
Leverage	7419	0.2566	0.2456	0.1618	0	0.8466
Tobin q	7419	1.7897	1.4166	1.2360	0.6038	9.7543
ROA	7419	0.0765	0.0700	0.0854	−0.4075	0.4019
R&D	7419	0.0151	0.00007	0.0343	−0.00005	0.5703
R&D and profitability	7419	0.0019	0	0.0671	−0.3537	4.0617
Environmental performance	7419	0.2921	0.013	1.0281	0.00002	7.2279

In total, we collected 4606 observations (2008–2019) from companies in the Asian–Oceanian region. In order to define all variables, a statistical description of the Asian–Oceanian region is presented in Table 4.

Table 4. Statistical description of companies from the Asian–Oceanian region.

Variable	N	Mean	p50	Standard Deviation	Min	Max
Size	4606	15.7333	15.7675	1.3397	10.9775	18.4544
Leverage	4606	0.2444	0.2347	0.1620	0	0.7104
Tobin q	4606	1.7357	1.2550	1.5286	0.5001	13.5580
ROA	4606	0.0769	0.0682	0.0862	−0.6445	0.4323
R&D	4606	0.0140	0.0011	0.0249	0	0.2297
R&D and profitability	4606	−0.0006	0.00001	0.0658	−3.1307	0.0373
Environmental performance	4606	0.4843	0.0241	1.3146	0.00001	8.3028

4. Results

The results are provided according to the framework of the research shown in Figure 1. First, the analysis results from both the European and Asian–Oceanian regions are presented jointly in terms of the statistics and regression models. The variables influencing the environmental performance of the financial and innovation indicators of companies were selected based on the obtained results. Second, companies from the European region were analyzed with the same goal of determining what financial and innovation indicators affect the environmental performance of companies. Third, the performance of companies in the Asian–Oceanian region was analyzed in terms of the financial, innovation, and environmental aspects.

OLS regression models were created using Stata 17 software. The obtained results are presented in Table 5. The independent variables describe the financial and innovation performance of the companies. The dependent variable reflects environmental activities as one of the most important goals of carbon dioxide minimization and climate neutralization. The company size (Size), leverage (Leverage), Tobin q indicator (Tobin q), and return on assets (ROA) represent the financial performance of companies. Research and development (R&D) expenses reflect the innovation activities of companies. Research and development expenses multiplied by profitability (R&D × profitability) represent the financial and innovation activities of companies together. The main goal was to answer the question of whether the financial and innovation performance of companies have an impact on their environmental performance.

Five out of six indicators revealed that the financial and innovation performance of companies really have a significant impact on their environmental performance. The return on assets (ROA) and research and development (R&D) expenditures have the greatest negative impact on environmental performance. Increasing ROA and R&D indicators reduce carbon dioxide emissions (negative relationship). This indicates that R&D expenditure directed towards more sustainable and cleaner innovations contributes to the reduction in environmental pollution. A higher return on assets creates favorable conditions for investing in cleaner innovations.

Company leverage also has a relatively high significant impact (positive relationship). This indicates that an increasing level of company debt can increase carbon dioxide emissions if companies increase their operational capacity but do not invest in cleaner innovations. Company size has a significant but relatively lower impact on environmental performance (positive relationship). Accordingly, carbon dioxide emissions depend on the output of the company, which is determined by the capacity and size.

Finally, the interaction of R&D expenditures and profitability has a significant effect on environmental performance (positive relationship). Increasing profits and R&D expenditure enable company expansion and capacity growth. As the output of a company's activities increases, their carbon dioxide emissions also increase. Therefore, corporate profits and R&D expenditure should be directed towards clean innovations that enable higher operational output but lower carbon emissions.

Table 5. Fitted OLS models of companies from both the European and Asian–Oceanian regions.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Size	0.039 **	0.039 **	0.043 **	0.039 **	0.039 **	0.042 **
	[0.019]	[0.019]	[0.018]	[0.019]	[0.019]	[0.018]
Leverage	0.847 ***	0.830 ***	0.849 ***	0.827 ***	0.844 ***	0.827 ***
	[0.187]	[0.186]	[0.187]	[0.186]	[0.188]	[0.186]
Tobin q	−0.018	−0.014		−0.013	−0.017	
	[0.015]	[0.015]		[0.015]	[0.015]	
ROA	−0.851 ***	−0.886 ***	−0.980 ***	−0.909 ***	−0.872 ***	−1.007 ***
	[0.209]	[0.210]	[0.176]	[0.215]	[0.214]	[0.180]
R&D		−1.197 ***		−1.283 ***	−1.212 ***	
		[0.370]		[0.371]	[0.365]	
R&D and profitability				0.126 ***	0.109 ***	0.136 ***
				[0.041]	[0.038]	[0.040]
Constant	−0.168	−0.163	−0.245	−0.159	−0.164	−0.213
	[0.425]	[0.424]	[0.411]	[0.425]	[0.425]	[0.411]
Adjusted R-squared	0.345	0.346	0.345	0.346	0.345	0.346
Observations	12,025	12,025	12,025	12,025	12,025	12,025

Standard errors reported in brackets under the estimated coefficients are robust for heteroskedasticity and clustered at the firm level. *** Estimated probability p is less than a significance level of 0.01 (1%). ** Estimated probability p is less than a significance level 0.05 (5%).

4.1. Results of Companies from the European Region

The obtained results are provided in Table 6. The results clarify the answer to one of the questions of this research: whether the financial and innovation performance of companies have an impact on the environmental performance. The results from the activities of European companies confirm that their financial and innovation performance have a significant impact on carbon dioxide emissions since a strong relationship was found between the same indicators as in the case of the combined regions.

ROA and R&D expenditures have the greatest impact on environmental performance. This is proof that increasing company ROA and R&D expenditure indicators reduce carbon dioxide emissions (negative relationship). A higher ROA enables higher R&D expenditures on green innovations that reduce carbon dioxide emissions in the long term. Company leverage also has a significant impact on environmental performance (positive relationship). This relationship is less strong than in the combined regions model, but it is still evidence that increasing levels of company debt can increase carbon emissions if firms increase their operational capacity but do not invest in green innovations. Company size has a significant impact on climate neutralization, but this impact is less significant than in the combined regions model (positive relationship). Carbon dioxide emissions depend on the company's production, capacity, and size. Business development without green innovation will not meet the goal of neutralizing the climate by 2050 [46]. The interaction of R&D expenditures and profitability has an important impact on environmental performance (positive relationship). This significant relationship confirms that profitability increases the possibility of R&D expenditure, but in order to reduce carbon dioxide emissions, R&D expenditure should create green and clean innovations. Finally, we provide evidence that firms' financial (ROA, leverage, size, and R&D expenditure and profitability multiplier) and innovation (R&D expenditures) performance have a significant impact on carbon emissions in the European and Asian–Oceanian regions together and separately in the European region.

Table 6. Fitted OLS models of companies from the European region.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Size	0.047 *	0.048 *	0.047 **	0.047 *	0.047 *	0.046 *
	[0.025]	[0.025]	[0.024]	[0.025]	[0.025]	[0.024]
Leverage	0.552 **	0.540 **	0.552 **	0.537 **	0.549 **	0.537 **
	[0.268]	[0.266]	[0.268]	[0.266]	[0.268]	[0.267]
Tobin q	0.002	0.008		0.009	0.004	
	[0.019]	[0.019]		[0.019]	[0.019]	
ROA	−0.909 ***	−0.947 ***	−0.892 ***	−0.981 ***	−0.940 ***	−0.917 ***
	[0.255]	[0.258]	[0.211]	[0.264]	[0.260]	[0.215]
R&D		−1.015 ***		−1.036 ***		−0.990 ***
		[0.366]		[0.367]		[0.335]
R&D and profitability				0.155 ***	0.133 ***	0.147 ***
				[0.051]	[0.047]	[0.041]
Constant	−0.217	−0.209	−0.211	−0.202	−0.211	−0.179
	[0.487]	[0.484]	[0.468]	[0.484]	[0.487]	[0.465]
Adjusted R-squared	0.303	0.303	0.303	0.304	0.303	0.304
Observations	7419	7419	7419	7419	7419	7419

Standard errors reported in brackets under the estimated coefficients are robust for heteroskedasticity and clustered at the firm level. *** Estimated probability p is less than a significance level of 0.01 (1%). ** Estimated probability p is less than a significance level of 0.05 (5%). * Estimated probability p is less than a significance level of 0.1 (10%).

4.2. Results of Companies from the Asian–Oceanian Region

The obtained results of the OLS regression models from the Asian–Oceanian region are provided in Table 7. The independent variables describe the financial and innovation performance of the companies. The developed regression models explain the relationship between the performance of companies and their environmental performance. In this context, environmental performance means the direction of the Green Deal—carbon dioxide emissions. The ROA of companies has a significant impact on carbon dioxide emissions (negative relationship). The same significant negative relationship was observed in the European region. This proves that the return on assets is indeed important in reducing carbon emissions, as the profits earned can be channeled into purchasing more sustainable and cleaner assets. However, it is noticeable that the relationship between the ROA and carbon dioxide emissions is stronger in the Asian–Oceanian region than in Europe (coefficient of −1.317 in Model 6 (Table 6) vs. coefficient of −0.917 in Model 6 (Table 4)). According to this, it can be assumed that the Asian–Oceanian region has a better chance of neutralizing the climate by using the influence of corporate return on assets. This indicates that many global giant companies operate in the Asian–Oceanian region, and the achievement of climate goals by 2050 depends on whether their profitability will be directed to "clean" or "dirty" innovations.

4.3. Performance of Companies in the European and Asian–Oceanian Regions According to WLS Models

The obtained results by WLS models for both the European and Asian–Oceanian regions are provided in Table 8 to answer the most important question of this research: whether the financial and innovation performance of companies have an impact on the environmental performance. Firms without green innovation will not coincide with the goal of neutralizing the climate [46]. The results from the activities of both regions' companies confirm that financial and innovation performance have a significant impact on carbon dioxide emissions. The ratios of ROA and R&D expenditures have the greatest impact on environmental performance. R&D expenditure should create green and clean innovations. This means that increasing a firm's ROA and R&D expenditure indicators reduces its carbon dioxide emissions (negative relationship). In addition, a higher R&D expenditure

on green innovation leads to a better ROA. Company leverage also has a significant impact on environmental performance in both regions (positive relationship). Firms can increase their operational capacity but, at the same time, may invest in green innovation. The impact of company size is less significant and positive because carbon dioxide emissions depend on the production and capacity of a company. Finally, firms' financial (ROA, leverage, and size) and innovation (R&D expenditure) performance have a significant impact on carbon emissions in both regions.

Table 7. Fitted OLS models of companies from Asian–Oceanian region.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Size	0.014	0.016	0.029	0.016	0.014	0.029
	[0.028]	[0.028]	[0.027]	[0.028]	[0.028]	[0.027]
Leverage	1.301 ***	1.261 ***	1.315 ***	1.260 ***	1.300 ***	1.268 ***
	[0.292]	[0.291]	[0.292]	[0.291]	[0.292]	[0.292]
Tobin q	−0.039	−0.036		−0.036	−0.039	
	[0.024]	[0.024]		[0.024]	[0.024]	
ROA	−1.002 **	−1.043 **	−1.292 ***	−1.049 **	−1.009 **	−1.317 ***
	[0.404]	[0.404]	[0.360]	[0.414]	[0.413]	[0.368]
R&D		−2.272 **		−2.275 **		−2.487 **
		[1.146]		[1.147]		[1.134]
R&D and profitability				0.059	0.054	0.072
				[0.070]	[0.069]	[0.068]
Constant	0.420	0.410	0.183	0.412	0.423	0.201
	[0.605]	[0.605]	[0.598]	[0.606]	[0.607]	[0.600]
Adjusted R-squared	0.426	0.427	0.425	0.427	0.426	0.426
Observations	4606	4606	4606	4606	4606	4606

Standard errors reported in brackets under the estimated coefficients are robust for heteroskedasticity and clustered at the firm level. *** Estimated probability *p* is less than a significance level of 0.01 (1%). ** Estimated probability *p* is less than a significance level of 0.05 (5%).

Table 8. WLS models of companies from European and Asian–Oceanian regions.

	European and Asian–Oceanian Region		**European Region**		**Asian–Oceanian Region**	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Size	0.041	0.046 *	0.043	0.042	0.039	0.045
	[0.027]	[0.026]	[0.036]	[0.034]	[0.037]	[0.037]
Leverage	0.836 ***	0.838 ***	0.763 **	0.763 **	1.179 ***	1.183 ***
	[0.229]	[0.228]	[0.339]	[0.341]	[0.336]	[0.335]
Tobin q	−0.023		0.004		−0.018	
	[0.021]		[0.027]		[0.032]	
ROA	−1.061 **	−1.253 ***	−1.102 ***	−1.077 ***	−1.450 *	−1.624 ***
	[0.413]	[0.324]	[0.420]	[0.353]	[0.743]	[0.552]
R&D	−1.650 ***	−1.809 ***	−1.708 ***	−1.686 ***	−0.740	−0.941
	[0.543]	[0.543]	[0.551]	[0.542]	[1.825]	[1.834]
R&D and profitability	0.137	0.153	0.265	0.262*	0.086	0.096
	[0.104]	[0.101]	[0.162]	[0.155]	[0.125]	[0.119]
Constant	−0.215	−0.293	0.041	0.048	−0.001	−0.086
	[0.429]	[0.416]	[0.598]	[0.574]	[0.680]	[0.685]
Adjusted R-squared	0.368	0.368	0.371	0.371	0.436	0.436
Observations	12,025	12,025	7419	7419	4606	4606

Standard errors reported in brackets under the estimated coefficients are robust for heteroskedasticity and clustered at the firm level. *** Estimated probability *p* is less than a significance level of 0.01 (1%). ** Estimated probability *p* is less than a significance level of 0.05 (5%). * Estimated probability *p* is less than a significance level of 0.1 (10%).

We can see that R&D expenditures significantly influence the carbon dioxide emissions (negative relationship) in the Asian–Oceanian region. The consistent relationship between R&D expenditure and carbon dioxide emissions in both the Asian–Oceanian and European regions proves that clean and green innovation coincides with climate neutralization. However, it can be seen that the relationship between R&D expenditures and carbon dioxide emissions is stronger in Europe than in the Asian–Oceanian region in (*** the estimated probability p is less than a significance level of 0.01 (1%) in the case of Europe vs. ** the estimated probability p is less than a significance level of 0.05 (5%) in the case of Asia–Oceania). In this case, companies in the European region can achieve climate neutrality faster by using R&D expenditures to develop and adopt clean and green innovations. The reason can be that companies operating in the European region allocate more R&D expenditures to sustainable innovation. Company leverage has a significant effect on environmental performance (positive relationship) in both Asia–Oceania and Europe. This proves that corporate development with borrowed capital without clean innovation will not achieve climate neutralization by 2050. In contrast to the European region, company size and the interaction of R&D expenditures and profitability do not have a significant impact in the Asian–Oceanian region. This indicates that the profit earned and the R&D expenditures separately are more important for companies in the Asian–Oceanian region to achieve sustainability goals in the long-term.

In summary, we provide evidence that the financial (ROA and leverage) and innovation (R&D expenditure) performance of companies has a significant impact on environmental performance in the Asian–Oceania region. This proves that borrowed capital, sustainable assets, and earned profits can coincide with the long-term goals of sustainability. Despite regional differences, financial and innovation performance can reduce environmental pollution and ultimately achieve climate neutrality 2050. However, it can be observed that Asia–Oceania has a better chance of achieving climate neutrality by channeling profitability into sustainable innovation. Large international companies are concentrated in this region, which have greater profits to direct to investment opportunities. Nevertheless, this will largely depend on the strategic decisions of companies.

5. Discussion

Endogeneity is one of the main concerns in this paper, which may influence the results when examining the relationship between financial performance and environmental performance [47]. This is because the same corporate characteristics can affect environmental performance and financial performance [47–49]. Differences in corporate characteristics influence financial performance outcomes, so the same differences may determine the impact of financial performance on environmental decisions [49]. By using the country, year, and industry fixed effects, concerns about omitted heterogeneity in the research are mitigated. However, omitted variables that potentially influence both financial performance and environmental performance or reverse causality and simultaneity determine the main findings of the research. A corporation can increase their profitability while reducing environmental pollution at the same time.

The problem of sustainability has been analyzed in many scientific studies [22], but with different approaches and goals. Nevertheless, a clean environment and human health, based on economic growth, are becoming increasingly important in both scientific studies and government strategies. The role of companies is especially important. The experience of companies, the attitude of managers, the specifics of the sector, financial resources, and the needs of consumers determine how quickly companies move towards the implementation of sustainability goals. Additionally, more and more consumers are concerned about sustainability and are increasingly choosing sustainable products [24]. To reach the goals of carbon-neutral economies, businesses, society, and governments are the three main implementers. The emphasis of this research was to reveal the relationship between the financial and innovation performance of companies, with environmental performance as the most important goal of the Green Deal [34]. We formulated the essential question to

investigate whether financial indicators (as financial performance) and R&D expenditure (as innovation performance) influence the emissions of carbon dioxide (as environmental performance). To achieve this goal, we analyzed companies from the European and Asian–Oceanian regions. In order to compare regional, we divided the sample of companies into two groups: European companies and Asian–Oceanian companies. In total, we collected 12,025 observations for the period of 2018–2019. The results of the regression models show a strong relationship between the financial and innovation indicators and environmental performance in both regions. Financial indicators, such as return on assets (ROA) and leverage (Leverage), significantly influenced environmental performance. The relationship between R&D expenditure and environmental performance was strong as well. This is proof that the profits earned by companies is or could be used to create sustainable and clean innovation, which can influence not only the company's growth potential but also environmental performance as one of the most important goals for a carbon-neutral economy. A question for discussion is what is the difference between European and Asian–Oceanian companies in terms of the interaction between their return on assets and profitability (R&D $\times$ profitability). The interaction of the financial and innovation performance of companies had a significant impact on environmental performance in Europe but not in the Asian–Oceanian region. Differences among the data samples, financial and innovation performance policies, and regions may explain this disagreement. Also as an object of discussion, this may be extended for other research.

The relationship between ROA and carbon dioxide emissions was stronger in the Asian–Oceanian region than in Europe. The relationship between R&D expenditures and carbon dioxide emissions was stronger in the European region. Many global large corporations operate in the Asian–Oceanian region, and the achievement of climate goals by 2050 depends on the direction of their clean investments; however, this will depend on the strategic decisions of companies. Companies in the European region can be named to achieve climate neutrality faster by using R&D expenditures to develop and adopt sustainable innovations.

6. Conclusions

The performance of the large and economy-shaping companies reflecting the European and Asian–Oceanian regions can coincide with the implementation of climate goals. We have distinguished three dimensions of factors in companies: financial, innovation, and environmental performance. Company size (Size), leverage (Leverage), Tobin q indicator (Tobin q), and return on assets (ROA) represent the financial performance. Research and experimental expenditure (R&D) reflect the innovation performance. We found strong and significant relationships between financial performance and environmental performance and between innovation performance and environmental performance. We also found the same strongly meaningful relationship between financial and innovation multipliers and environmental performance only in the European region. The strong negative relationship between return on assets and carbon emissions, and similarly between R&D expenditure and carbon emissions, is an important result for long-term climate neutralization in both the European and Asian–Oceanian regions. Thus, in the long run, who wins the race will depend on the strategic decisions of companies, as this will require both profitability and R&D expenditures. As the indicators of return on assets and R&D expenditure increase, carbon dioxide emissions may decrease, as appropriate innovation can achieve high added value without polluting the environment. It is also noteworthy that increasing debt levels directed towards R&D expenditure can contribute to profit generation and environmental pollution reduction as well. In the implementation of climate goals, the reduction in environmental pollution is a long-term objective; so, the management of companies must also make sustainable decisions related to the partial allocation of profits to create clean and sustainable innovations. These innovations could ensure the efficiency of companies' activities, competitiveness in the market, and a reduction in environmental pollution. Therefore, summarizing what the research results show, the coherence of the financial,

innovation, and environmental performance of companies can be the instrument that leads to achieving the global climate-neutral goals.

Limitations and Future Research Directions

This research, which complements other research on the importance of corporate sustainability, environmental protection, innovation, financial performance, and their interactions, is not without limitations. Acknowledging these limitations is critical to maintaining a nuanced and realistic perspective of scientific endeavors in the context of corporate sustainability, innovation, and financial performance. One of the limitations of the study is the problem of small sample size, as the study only included 2958 companies. This may hinder the generalizability of the findings, as compared to studies that examine more than 3000 companies. When the number of companies in the study is insufficient, the results may not reflect the true situation.

Another limitation is the use of company sectors, as the study covered only eight sectors. If studies look at more sectors, the results may not be valid. This means that the findings may not be applicable or generalizable to other contexts.

The limitations of the time series of the data also present challenges to this research, as post-pandemic years were not included. In order to fully understand the sustainability of the companies being studied, the transition to environmental requirements, the importance of innovation in the transition to sustainability, and the impact of financial activities, long-term research with the latest data is needed. In this case, time constraints can limit the depth of the research and may prevent researchers from fully understanding the topic.

This research only covers two regions: Europe and Asia–Oceania. The regions of North and South America and Australia were not included. A total of six independent variables and one dependent variable were included.

Despite these limitations, scientific methods applied to corporate sustainability, environmental performance, innovation performance, and financial performance are a self-correcting process. Researchers are constantly improving their methods, building on existing knowledge, and addressing limitations in subsequent studies. Recognizing these limitations is an essential aspect of scientific rigor and transparency.

Corporate sustainability in scientific research is likely to remain very relevant; so, the main issues of corporate sustainability will remain, to which we plan to contribute with our research. It is planned to continue this research by including the North American region and more indicators from the field of sustainability.

We prioritize research that will examine the relationships between corporate sustainability performance and financial performance in the post-pandemic period compared to the pre-pandemic period. The research should examine how telecommuting has affected corporate sustainability goals and employee behavior. It should also examine how corporate business models and strategies have changed since the pandemic. In addition, the research should evaluate the integration of financial, environmental, social, and management indicators into annual reports, their standardization possibilities, and good examples to achieve greater transparency and comparability. Again, the research should focus more on green finance and investment to scale up sustainable finance. In the future, collaborations among researchers, business, and policy makers are likely to only increase due to the increasing complexity of the challenges, thus enabling the potential of research.

Author Contributions: Conceptualization, R.V., K.S., B.K. and R.K.; methodology, R.V., K.S., B.K. and R.K.; software, R.V., K.S., B.K. and R.K.; validation, R.V., K.S., B.K. and R.K.; formal analysis, R.V., K.S., B.K. and R.K.; investigation, R.V., K.S., B.K. and R.K.; resources, R.V., K.S., B.K. and R.K.; data curation, R.V., K.S., B.K. and R.K.; writing—original draft preparation, R.V., K.S., B.K. and R.K.; writing—review and editing, R.V., K.S., B.K. and R.K.; visualization, R.V., K.S., B.K. and R.K.; supervision, R.V., K.S., B.K. and R.K.; project administration, R.V., K.S., B.K. and R.K.; funding acquisition, R.V., K.S., B.K. and R.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research has received funding from the Research Council of Lithuania (LMTLT), agreement No. S-PD-22-23.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The authors declare no conflicts of interest.

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