administrative sciences

MDPI

Article

CSR-Mediating CO_2 Policy Effects on Environmental Kuznets Curve in Brazil: Case Study of an Airline Company

Juliana Lovatte, Sarah da Silva Everton, Joshua Onome Imoniana * and Funmi Alakija

Department of Accounting & Actuarial Sciences, University of Sao Paulo, Prof. Luciano Gualberto, Ave. 908 FEA3 Building, Office 238, Sao Paulo 05508-010, Brazil; julianalovatte@usp.br (J.L.); sarahev@usp.br (S.d.S.E.); fualakija@gmail.com (F.A.)

* Correspondence: josh.imoniana@usp.br

Abstract: This study employs a critical perspective: aiming to provide a subjective and socially constructed view on the impact of corporate governance and the corporate social responsibility (CSR) choices on the environmental Kuznets curve (EKC) in terms of CO_2 emissions in Brazil. This research paper bridges the gap in the literature on the EKC by toeing a qualitative approach to what has been presented using quantitative methods, and offers insights on how the trends shape organisational policies. Furthermore, it enumerates the relationship between CSR, CO_2 choices, and EKC in the Brazilian aviation industry using one particular airline as a case study. It aims to provoke further conversation on decarbonisation. It seeks to show how EKC has been treated and to contextualise the impact of the airline sector's CSR and corporate governance on EKC. A combination of a content analysis of the narratives of sustainability reports and a semi-structured interview with a sustainability expert from the aviation sector was used in data gathering, while critical discourse analysis (CDA) was employed in demonstrating the ideological and social contexts that shape organisational narratives and decisions in practices and governance structures that are driving CO_2 reduction strategies. The findings not only confirmed the crucial role that corporate governance plays in the implementation and monitoring of CSR practices within the sector but also shows the impact of integrating sustainability goals into corporate strategies. The policies nurtured by CSR are supported by the company's ESG and Social Responsibility Committees. In the context of the case study, the corporate decision to transit to biofuels is contributing not only to the reduction in CO_2 emissions but is also seen as an economically viable strategy with public policies and regulatory frameworks. This paper further explains the impact of geopolitical factors and the need for international cooperation because the traditional U-shaped EKC is not supported in the context of the Brazilian aviation sector. Finally, this spurs the need for collaboration among various stakeholder companies, policymakers, and nations in the global context for sustainable development to have a lasting impact.

Keywords: corporate social responsibility (CSR); environmental Kuznets curve; corporate governance; CO_2 emissions; Brazil

check for updates

Received: 22 February 2025
Revised: 10 May 2025
Accepted: 17 May 2025
Published: 27 May 2025

Citation: Lovatte, J., Everton, S. d. S., Imoniana, J. O., & Alakija, F. (2025). CSR-Mediating CO_2 Policy Effects on Environmental Kuznets Curve in Brazil: Case Study of an Airline Company. *Administrative Sciences*, *15*(6), 207. https://doi.org/10.3390/admsci15060207

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

The world is interconnected; therefore, contemporary debates on the sustainability of the environment, and the responsibilities of organisations to be ethical in combining economic impact as well as planetary preservation in their corporate governance and policies, require both local and global considerations. This research paper aims to provoke a local impact of a global phenomenon, especially given that, hitherto, most of the studies

on the environmental Kuznets curve (EKC) and environmental sustainability have explored a quantitative paradigm. This current study, therefore, adopts a qualitative research paradigm that offers not a statistical analysis of carbon dioxide reduction in sustainable environmental discourses/debates but an explanation of how CSR mediates CO_2 policies and its effects on EKC in Brazil in the context of the aviation industry using a single case study of a Brazilian airline company.

Even as sustainability has taken centre stage in academic and public discourses in recent time, it has come to occupy a considerable place both in theories of sustainable change and in environmental discourse and academic literature (Audet, 2016). Thus lingering across various sectors of the economy, from the fashion industry to the travel industry and many other areas because of production practices and the economic impact as well as its effect on the environment, Brazil has become a central player because of its geographical location and its rich natural resources in the Amazon. Furthermore, tourism and travel have grown in Brazil, necessitating the exploration of the impact of airlines on the environment in terms of both profit for organisations/industry as a whole and the need to control the effect of carbon emissions.

Supposing that companies are able to respond to the tension between profit and environmental sustainability, tension between those with an interest in the activities of the organisation in terms of social and environmental sustainability at a profit, thereby undermine the environmental efforts made (Brennan et al., 2011). This leads to the significant challenge of trying to simultaneously manage social, environmental, and financial performance, which is one of the most critical challenges in the field of corporate sustainability Epstein et al. (2015). What better place to start than to investigate the impact of their CSR policies designed through corporate governance on responding to the social and environmental need to give back to the communities in which they operate, especially given the global impact of carbon emissions? As a result, this paper presents how CSR strategy developed through corporate governance mediates the reduction of CO_2 emissions in the selected airline company in Brazil.

In the same vein, CSR, according to Oso and Alakija (2008) and Yoro and Daramola (2020), is a system whereby companies give back to society. Because of the economic/profit orientation of organisations, often, and arguably, accepting responsibility for the organisation's impact on society and the environment is a difficult line to draw. In recent times, however, as a result of planetary concerns, many organisations have been encouraged to take into consideration the social, economic, and environmental impacts of their activities—the Triple Bottom Line (Elkington, 1998)—not only on their local communities but also for a world that has become globally connected in order to attain the 2030 sustainability goals. Through corporate governance, arguably, some organisations have responded to this challenge among other responsibilities, as well as the imperative need to adhere to the dictum that sustainable development (Putri et al., 2019) necessitates the ability to meet the needs of the current generation without jeopardising or reducing the ability of future generations to meet theirs as well. This is essentially the focus of environmentalists and the development of the sustainable goals set forth by the United Nations and other stakeholders.

This focus on the environment and the implication of protecting the same for continuity's sake, as well as the needs of future generations, require current organisations to consider the impact of their current administration and economic aspirations on the future needs of subsequent generations. As a result, their economic activities require developing an internal rule and management processes, therefore allowing for an ethical corporate governance that would meet current needs and make provisions for the future. Although CSR is not mandatory, it is a volitional, voluntary decision to impact communities and the

society at large, and in the current epoch, a global community, a good corporate governance framework is an essential step to making this decision.

On the other level, environmental sustainability is one of the factors that a good corporate governance strategy should include in its internal mechanism structures concentrating not only on profit making but also on accountability and ethical, transparent behavior. Volitional commitment by organisational management to social and ethical environmental sustainability, not only because it is legally required, although many countries such as India has the Companies Act of 2013. In Brazil, the legislation is quite extensive, provided for in the Constitution, Chapter VI Environment; covering various areas of agricultural and industrial activities from biofuels to the protection of native vegetation, disposal of solid waste, climate change, sustainability of aquaculture, fisheries a, biodiversity and other related areas.

For Brazilian organisations, responding to these legal requirements necessitates a CSR policy that invariably focuses on actions to mitigate environmental risks given Brazil's position as a major player in the global context given the central impact her Amazon could have on the whole world. Therefore, businesses and organisations in the nation's processes of translating from mainly agrarian production to industrial, which has been unprecedented in decades, need the application of EKC to meet the global goals of people, planet, property, peace and partnership (DAAD—German Academic Exchange Service, ND). Deliberate planning of policies must have to go beyond the choices made to address managerial appetite, to include corporate governance (CG) rules that have human face, not just financial gains.

Thus, the carbon emission reduction policy, hereafter referred to as the CO_2 emission policy, requires a specific type of response and decision that is deliberately planned and qualitatively inspired by subjective judgments' of giving back to society in Corporate Governance guidelines. Unfortunately, this has not been the response of the United States of American President Donald Trump and the immediate past President of the Federal Republic of Brazil—Jair Bolsonaro. According to BBC (2020) Joseph Goffman, executive director of Harvard's Environmental Law Programme, argues that Mr Trump "believes nothing on climate change". This same perception has been expressed concerning the former Brazilian president on the issue. The non-recognition of the menace of carbon emissions is contrary to persistent emphasis in sustainability development goals (SDG), which has consistently called the attention of top echelons and those at the helm of affairs of organisations not to stay aloof for individual responses to CO_2 emissions and social impacts. As a result, the analysing the effectiveness of measures taken by organisations, policies formulated by government and stakeholders to reduce these emissions (Lipford & Yandle, 2010) continues to take centre stage in environmental discourses.

The basic proposition of the EKC is that an inverted U-shaped relationship exists between environmental degradation and economic growth (Orubu & Omotor, 2011); several studies such as the World Bank Development Report of 1992; Selden and Song (1994) and (Beek, 2019); had confirmed the impact of economic growth on the environment since 1955 when the economist, Simeon Kuznets proposed his theory in the 1950s and 1960s. EKC revealed that development is not a-way process, a complex phenomenon that presupposes that the process that brings about an increase in per-capita income is also the source of another problem—environmental pollution. Both processes are one side of the same coin, the positive side is that the initial increase in environmental pollution as a result of industrial activities that impacts positively a country's GDP only happens that the early stages of economic development, only to decrease as the country moves further in its development. Although, this has inverted process has been positive with regards to more developed/advanced economies of the West; scholars have argued that although advanced

countries have been able to manage this process in their immediate environment, the impact is far-reaching on less developed/developing countries (Guo & Shahbaz, 2024). Irrespective of these conversations, the world has recognised the reverse side of economic development on the planet and, therefore, calls for collaborative partnership in making the world safe for current generations and those that are yet to emerge. Thus, this paper presents the processes in airlines and how the industry is managing CO_2 emissions in its corporate governance policies as reflected in the CSR commitments.

This symbiotic relationship between income growth and environmental degradation suggests a necessity to, from time to time, follow how emitters are sensitised to the impacts; defacto, pollution, and inequality are correlated features in a developmental economy. The incidences associated with developments in the southern region of Brazil between rainy precipitation and damage in April–May 2024, specifically bordering Rio Grande do Sul (RS), Santa Catarina, which has been inundated by floods attest to this fact. Thus, is this attributable to the environmental CSR misuse of carbon emission reduction policies? Tragedy in RS: Experts have warned about possible floods in the state since 2012 (Journalism-Cultura, 2023). What is the impact of the state's strategic planning for using soils, industrial operations, farming activities, and envisaging a circular economy, considering that RS is a highly concentrated agricultural activity (75%) in Brazil? According to Naveed et al. (2022), for future direction, it would be interesting to investigate EKC against a wider nature-economy nexus that could better explain the sources and causes of change in the type of such nexus.

Prior studies signal research gap in the studies that explore EKC and CSR. Pincheira and Zuniga (2020) conducted a bibliographic map method to identify the main research streams and to identify possible gaps and areas for future research and six research streams were identified: testing the basic EKC equation, critique of EKC, determinants of EKC, review of EKC, a nexus of income–energy consumption and new environmental indicators. Leal and Marques (2022) observe through critical analysis that through the fast growth and development of economies and technology and the increasing complexity of environmental degradation issues, the EKC has started to be employed to analyse not only environmental indicators and not only through simple models, however, but an absence of consensus is also noted. In the same vein, Moy-ud-Din et al. (2025) explore the role of CSR in bolstering firm resilience amid the escalating threats of climate change and climate policy uncertainties drawing on EKC theory. However, there appears much more to be a lag from the qualitative perspective than has been acknowledge in the literature all a while.

To this effect, understanding the relationships between economic growth and derivation from environmental resources, otherwise referred to as the environmental Kuznets Curve (EKC) becomes essential. Empirical evidence of the environmental Kuznets curve in the Brazilian context is considered an essential factor in climate issue decision-making (Freire et al., 2023). Despite this importance, research gaps still exist because most of the published articles on EKC are statistically based analyses; hence, this paper supplies the gap in EKC analysis by employing qualitative paradigm. Although Goklany (1999) has examined the forces underlying changes in pollution from a more direct policy analysis approach rather than engaging in statistical analysis to estimate an EKC, we are undertaking this research paper as ex-ante in the hope of filling literary gaps in environmental sustainability, such as that propagated by Gallego-Alvarez et al. (2015), Assis et al. (2023), and Imoniana et al. (2022), among others. Also, by employing an interpretive paradigm, we aim to provide the subjective and socially constructed view of the airline executives interviewed combined with available archives on the impact of corporate governance and the CSR choices on the Kuznets curve in terms of CO_2 emission in Brazil. The aviation industry is the focus because of its current commitment to completely reduce carbon emission by

100% in the year 2050, despite its already transition strategy to the use of advanced biofuels over the next 20–40 years. Linking to a proposal of a carbon neutral growth from 2027 as per the Ministry of Ports and Airports for the periods of 2022/2023 (Ministério de Portos e Aeroportos, 2022). The aviation industry in Brazil is one of the fastest growing industries in the country, thus, the impact of its corporate governance regarding CSR policy. Thus, this study is nurtured by research question (*R*1)—How is the CSR mediating CO_2 policies effects on Environmental Kuznets Curve in Brazil toeing Case Study of an Airline Company.

Logically, the paper is organised as follows. Section 2 following this introduction presents the theoretical discussion. Section 3 in the same line of thought covers the methodology, and Section 4 Data analysis that foregrounds the discussion of findings. To finalise, Section 5 presents the conclusion and recommendations for further studies, limitations and future policy formulations.

2. Theoretical Grounding

From 1850 to 2010, studies have shown the impact of income distribution as a result of economic development in Brazil in line with the Kuznets curves; an increase was noted between the 1970s and 1990s, only to decline later influenced by other political and economic factors that are regarded as the second phase of the Kuznets. Measuring the levels of pollutants between 1980 and 2020 using the Grossman and Krueger (1995) regression model, these scholars observed a decrease in carbon dioxide and nitrone oxide: but none in methane gas. This, however, does not negate the fact that Brazil has the largest carbon reservoir in the global landscape and a significant influence in the discourse of environment sustainability and global environmental issues because of the position of Amazon in world natural resources (Carrero et al., 2020). The implications for economic growth, politics, and sustainable development are, therefore, huge.

Zambrano-Monserrate et al. (2016) observed a quadratic long-run relationship between CO_2 emissions and economic growth, confirming the existence of an EKC for Brazil. Furthermore, energy use increases emissions, whereas electricity production from hydropower sources has an inverse relationship with environmental degradation. Notably, Brazil is one of the top players in the quest to reduce environmental degradation and is the heart of the world.

As per conception of CO_2 level, Amazon partakes most importantly. Brazil is a major player in the greenhouse sourcing in the amazons, transmitting from agrarian to industrial among other fonts; thus, application of EKC to meet global goals of people, planet, property, peace, and partnership (5Ps) provides a crucial gap for academics to add the Brazilian voice to the debates. Thus, counting on the presentation of the findings of this airline case study is setting the stage for contextual Brazilian contribution among others to these debates where airlines' emissions are estimated to be significant.

Literature on EKC postulates an inverted curve whereby the relationship between pollution and per capita income is ignorable because the initial increase in environmental pollution as a result of industrial growth and increase in country income at the early stages of economic development decreases as more development is experienced (Guo & Shahbaz, 2024). Scholars have argued that although this may be true in the context of advanced countries because they have been able to manage the impact of their industrialisation internally, yet there is a far-reaching impact on less developed developing country (Guo & Shahbaz, 2024). Although arguments have shown that economic growth drives environmental challenges, scholars have invariably confirmed the inverted curve impact on economic growth and environment (World Bank, 2003). Similarly, Stern (2004) showed the reversal on higher economic income even though Kuznets had proposed his relationship in 1955; Shahbaz et al. (2012) affirm that sustainable economic development leads to environmental

sustainability in the long run, these same authors argue that global pollutants may not necessarily show investment.

Regardless of is divergence in arguments, CO_2 reduction has taken a central stage in the global context, and Muhammad Saiba Françoise Benhmad in his discourse in 2012 have shown how economic activities and environmental quality have both long- and short-term implications. This has been buttressed by Stern (2004) concerning economic growth and energy; and emissions. Similarly, in the context of Brazil, literature has demonstrated how carbon emissions improved from the 1970s to 2022. As per Cordeiro et al. (2022); it is due to a reduction in deforestation, the use of thermal power plants, abundant rainfall that filled hydroelectric reservoirs.

2.1. Brazil and Environmental Sustainability

One of the key aspects of the literature on environmental sustainability is the management of Carbon Emission Reduction (CER) or CO_2 emission levels. Understanding the Brazilian context of CO_2 consumption, more than 81% of the electricity produced in Brazil comes from hydropower plants (Flórez-Orrego et al., 2014). The Amazon contributes 70% of the oxygen provided to the lungs worldwide. Constituting in the largest world tropical forests that handle the CO_2. Defacto, Brazil, hosts the second largest hydropower plant in the world, the Itaipu Dam, which supplies more than 20% of Brazilian energy consumption (de Miranda Ribeiro & da Silva, 2010).

CO_2 emissions, in an indiscriminate form, have generated an inconsequential environmental degradation impact in developing countries. One common challenge confronting many developing countries recently is environmental degradation. Industrial activities have increased atmospheric carbon emissions due to the growing industrialisation and urbanisation in many developing countries.

Concerns about environmental sustainability can be embarrassing if it is claimed that it ranges from resources depleted by burning of forests, felling of trees, or deforestation for agriculture, apart from the combustion of fossil fuel (major emitter), burning of oils and gas culminates in the combustion of coal. CH4 emissions include emissions from human activities (in general) that will increase beyond the Sustainable Development Goals 2030 threshold. CO_2 (Carbon dioxide) is emitted when fossil fuels (coal, natural gas, and oils) and biological solid waste trees are burned. CO_2 is naturally removed from the atmosphere (or sequestered) when plants absorb it as part of their carbon life cycle. N_2O (Nitous Oxide) is emitted from biogas processes.

CO_2 emissions will continue to increase unless humans mitigate them. Thus, upon treating the mitigation of CO_2 emissions, a wider scope of research has recommended two major methods to minimise CO_2 emissions, being to discontinue the use of fossil fuels and also, embracing Carbon Capture Storage (CCS) technology.

Overall, CSR tools emanating from this discussion of CO_2 emissions were the protocol adopted in Kyoto on 11 December 1997, with 192 signatory countries. The Doha amendment to Kyoto enacted 37 nation-states with mandatory objectives.

As a result of the concerns from various stakeholders holding concerns to CO_2 emissions, emitters have strived to invest in mitigating resources. In fact, over the last two decades, various methods have been applied to improve our knowledge (Weissert et al., 2014) about the potential of urban forests to mitigate CO_2 emissions, and in the same line of thought, Lin and Ma (2022) observed the role of different paths of technological progress in mitigating China's CO_2 emissions.

Catalytic Converters primarily work to reduce harmful pollutants, while CO_2 emissions result from the combustion process itself. The converter's impact on CO_2 is indirect—

improving combustion and reducing other emissions can contribute to overall efficiency, which might influence CO_2 output.

Particulate filters, such as Diesel Particulate Filters (DPFs), are primarily designed to capture and remove particulate matter (PM) from vehicle exhaust gases, particularly in diesel engines.

Thermal Management Strategies play an essential role in mitigating CO_2 emissions, especially in industries involving energy generation, transportation, and electronics. These strategies focus on optimising heat flow, improving energy efficiency, and reducing the need for energy-intensive cooling or heating.

Evaporative Emission Controls are highly effective in reducing vehicle-generated hydrocarbon emissions and ensuring compliance with environmental standards. The technology has become more dependable, with advanced monitoring and diagnostics improving the chances of identifying and correcting malfunctions. When appropriately maintained, EVAP systems provide significant benefits in terms of reducing air pollution, promoting environmental sustainability, and improving public health.

Enhanced Combustion Technologies and Sensor Technologies mitigate CO_2 emissions, when used together; Enhanced Combustion Technologies and Sensor Technologies can synergistically reduce CO_2 emissions. Also, improving combustion efficiency and using sensors to fine-tune operations enable immediate reductions in CO_2 emissions and long-term benefits for sustainable energy use.

2.2. Organisational Operations, Environment and Finance

While the abovementioned strategies are a positive development; the financial implications must be considered. The impact of carbon emissions on organisational operations and environment as laudable and important as it is, one cannot overlook the fact that companies are set up for profit. Therefore, the financial perspective has to be considered in the context of each nation's CSR and corporate governance.

The relationship between companies' financial performance and environmental practices has aroused the interest of several researchers worldwide in recent years. Gallego-Alvarez et al. (2015) investigated the relationship between carbon emission reduction and international companies' financial and operational performance. Their findings show that emission reduction positively impacts financial performance, and that companies promote greater environmental behavior to obtain higher financial performance.

The framework developed by Trinks et al. (2020) established a direct relationship between carbon emissions and productive or resource efficiency. The results indicate that companies with greater carbon efficiency (i.e., best practices) have superior financial results.

According to Desai et al. (2022) the impact of carbon emissions on the financial performance is negative and significant. The research found that carbon emissions adversely affect both the accounting and market measures of financial performance. Yu et al. (2022) expand on the discussion proposed by Desai et al. (2022) by investigating the effect of the emissions trading system (ETS) on firms' financial performance in China. This study reveals that under an ETS, it is possible to achieve both carbon emissions reductions and financial performance improvements. However, despite the observed financial gains, innovation and efficiency within firms are critical factors mediating this impact.

On the other hand, Lewandowski (2017) and Delmas et al. (2015) suggest that the relationship between carbon emission reduction and financial performance may not be consistent. They found that while reducing greenhouse gas emissions can enhance short-term financial performance, it might lead to a decline in the long term.

As a result of this implication, Yunus et al. (2016) find that the presence of a CSR committee, larger board size, and greater board independence positively influences carbon

disclosures. Similarly, Kılıç and Kuzey (2019), in their study of Turkish firms, report that higher board independence increases the likelihood of responding to the Carbon Disclosure Project (CDP). They also observed that board nationality diversity and the existence of a CSR committee positively impact both the extent and quality of carbon emission disclosure. In this context, significant milestones can be achieved when CSR through CR stimulates the right decisions and the body politic intervenes in the state of affairs aiming at the well-being (EKC) of employees and their communities. This could pave the way for substantial economic transformations and societal advancement.

In this regard, Kotler and Lee (2005) argue that corporate governance is crucial in aligning CSR and Technology Strategy (ERCT) with business objectives through strategic planning. Effective integration of CSR practices with a company's strategic goals ensures that social responsibility initiatives become integral to the corporate vision and mission. By establishing and overseeing strategic guidelines, corporate governance ensures that resources are allocated to actions that foster both economic growth and positive social impact.

Nascimento and Reginato (2008) underscored the need for a robust link between corporate governance and national controls to enhance the quality of information disclosed by Brazilian listed companies. They highlight that effective governance frameworks are crucial for improving the transparency and reliability of reporting. Qian and Schaltegger (2017) find a positive correlation between improved carbon disclosure levels and better carbon performance, suggesting that enhanced CSR disclosures can drive progress in carbon emission reduction (CER).

These insights are further supported by Oyewo (2023), who emphasises that effective governance mechanisms, such as frequent and productive board meetings, board independence, and integrating Environmental, Social, and Governance (ESG) criteria into executive compensation, ensure rigorous oversight of environmental policies and practices. Such governance structures align financial incentives with sustainability goals, motivating leaders to prioritise carbon reduction. In this context, strong corporate governance fosters transparency and accountability, enabling businesses to achieve decarbonisation targets and enhance their CSR practices.

2.3. Brazilian Context and the Environmental Kuznets Curve

The Environmental Kuznets Curve (EKC) is an economic theory suggesting that as a country's income increases, its environmental quality initially worsens but then improves with further economic growth. This theory is based on the idea that as countries become wealthier, they are able to invest more in environmental protection and pollution control. The EKC has been used to explain the relationship between economic growth and environmental quality in various contexts, including air and water pollution, deforestation, and biodiversity loss.

The EKC has alerted the United Nations to the Sustainable Development Goals (SDGs), which aim to reduce poverty and promote economic growth while protecting the environment. This is particularly tied to SDG 1 (no poverty) and SDG 10 (reduced inequalities), as stressed by Oliveira et al. (2022).

Considering other developing countries, such as Indonesia, China, and India, Alam et al. (2016) point out that Brazil has the highest economic growth. Furthermore, the results of this study indicate that the EKC theory for CO_2 emissions is valid in the Brazilian context in both the short and long terms. This implies that the level of CO_2 emissions initially increases but tends to decrease over time as per capita income increases.

Although qualitatively, Environmental Kuznet Curve is considered an economic theory, it is not explicitly associated with financial-oriented qualitative characteristics, instead, it is used to assess its usefulness in decision-making. Gabon is the only country

that displays the qualitative characteristics of the original EKC cluster (Nuroglu & Kunst, 2018). The characteristics of emissions rose to high levels and then stabilised again against the backdrop of strong economic growth. However, one could argue that EKC indirectly affects the qualitative characteristics of relevance.

Relevance is a qualitative characteristic that indicates that financial information influences users' economic decisions by providing useful information. In the context of the Kuznets curve, as income inequality decreases with economic development, the wealth distribution becomes more equitable, potentially leading to more relevant financial information. Users of financial information, such as investors, lenders, and policymakers, may use the Kuznets curve to gain insight into the relationship between economic growth and income inequality.

This information is relevant to corporate governance when monitoring decisions related to investment, lending, and implementing policies that promote equitable economic development. However, one could argue that EKC indirectly affects the qualitative characteristics of relevance. Relevance is a qualitative characteristic that indicates that financial information influences users' economic decisions by providing useful information.

In the context of the Kuznets curve, as income inequality decreases with economic development, the wealth distribution becomes more equitable, potentially leading to more relevant financial information. Users of financial information, such as investors, lenders, and policymakers, may use the Kuznets curve to gain insight into the relationship between economic growth and income inequality.

Given the importance of the Kuznet in ginning insight into the relationship between economic growth, income inequality and the environment, this paper bases the findings presented in the discussion of results on the assumption/proposition that:

*P*1—The relationship between CSR and CG may not generally support the idea of classical or environmental Kuznets curves that are inverse U.

3. Methodology

The study adopted qualitative paradigm toeing the critical perspective allows us to examine the interpretations and perceptions of individuals involved in the CG and CSR processes. The methodological choice is based on the need to capture the nuances and complexities of CSR practices concerning carbon emissions reduction choices.

Critical discourse analysis (CDA) was used to analyze the content documents and interviews, as proposed by Fairclough (1995). According to the author, CDA is not limited to the discourse itself; it also involves the analysis of dialectical relationships between discourse and other objects. According to Fairclough (1995), the analysis of these relations crosses conventional boundaries between disciplines and is configured as a form of transdisciplinary analysis. Pêcheux (1997) emphasised the importance of considering discourse as a product of social and ideological relations. Emphasizing on power dynamics and ideological influences in CSR and CG practices.

CDA also considers the discursive and ideological formations that shape organizsational practices. Pêcheux (1997) observed that discursive formations are rules that dictate what can and should be said in a social context. Ideologies and power relationships influence them. CDA is suitable for analysing how company narratives on CG and CSR are constructed and influenced by social and ideological factors. In this way, the CDA also helped us understand the dialectical relationships between social practices, discourse, and power relations.

As a research strategy, apart from the interview, we chose to complement the data corpus with the case study. According to Yin (2003), a case study allows the specific context of an organisation to be explored in depth. Additionally, in the works of Eisenhardt

(1989), Pagell and Wu (2009), and Ketokivi and Choi (2014) the adoption of case-based studies enables researchers to gain insight into how many cases are adequately necessary to adequately address research questions. In this case the airline has been singled out as as genuinely important for this study. Furthermore, the author highlights that case studies have a distinctive place in evaluation research, and among their applications, the most important is the fact that they explain the presumed causal links in real-life interventions that are too complex for survey or experimental strategies. Thus, the case study proved to be the best strategy to analyse the dynamics of the organisation in more detail, which is essential for understanding the particularity and applicability of the EKC in the context of a Brazilian organisation.

The aviation sector was chosen as the focus of this study because it predominantly uses fossil fuels and is under constant pressure to adopt sustainable practices. In addition, the sector is highly regulated, and from 2027 onwards, airlines will have to comply with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to reduce carbon emissions. The airline analysed was chosen because of its prominence in the Brazilian aviation market and its active engagement in CSR and CG practices. What we loose with the only chosen case, a few, we gain with the representation of the case in the aviation industry. Also, because it is a company listed on the Brazilian stock exchange (B3), documents relevant to the study are easily accessible.

De facto, the data for the study were collected through documents available on the Company's Investor Relations page and through a semi-structured interview with an executive from the Air Line organisation, who is an expert in sustainability and decarbonisation. The documents used as data sources included the company's sustainability report, climate risk report, and reports defining the company's material issues. The relevance of the topics justifies the selection of these documents, and because they provide information on CG practices, CSR, and choices to reduce CO_2 emissions.

During the interview design and conception process, the decisions made by Qu and Dumay (2011) regarding who to interview, how many interviewees would be required, what type of interview to conduct, and how the interview data would be analysed were considered. The choice of the semi-structured model is due to the fact that this structure is often the most effective and convenient means of gathering information (Kvale & Brinkmann, 2009). As it is a flexible, intelligible model capable of disclosing significant and often hidden aspects of human and organisational behavior, the semi-structured approach offers an opportunity to establish an environment for the co-construction of meanings between interviewers and interviewees (Bryman & Cassell, 2006; Qu & Dumay, 2011). Although the number of interviews was limited to a single interviewee, his experience and in-depth knowledge of the topic provided valuable insights into the organisation's practices.

Data analysis was conducted through triangulation between the content of the analysed documents, interviews with experts, and the theoretical framework of the research. Triangulation enhances the validity of a study and helps illuminate different perspectives and power imbalances (Natow, 2019). In the context of this study, triangulation provides a deeper understanding of the interactions between CG, CSR, and carbon reduction choices in an organisation. The document analysis focused on identifying patterns and practices related to governance and carbon reduction initiatives.

4. Discussion of Findings

The Environmental Kuznets Curve, Corporate Social Responsibility, and corporate governance are interconnected through their collective impact on environmental sustainability and economic development. The interplay between the EKC, CSR, and corporate governance highlights the importance of integrated strategies that promote economic

growth while ensuring environmental sustainability. Strong governance structures support effective CSR initiatives, which in turn can influence the trajectory of the EKC towards more sustainable outcomes. And being analysed in a qualitative perspective, furnishes a holistic approach to addressing the issue in a more diverse manner differently from the more common quantitative approach.

To ensuring that the analysis is grounded in established theories it considered key issues addressed in the climate change, materiality definition, and narratives of sustainability reports published by the company. The reports analysed are the most recent disclosures by the airline. Additionally, an expert in sustainability and decarbonisation was interviewed to deepen the understanding of the issues presented in the report and ensure data validity and reliability.

The interview was transcribed, and both the interview and reports were coded using the MAXQDA version 24.9 software. The codes were grouped into two main categories: internal/organisational and external environments.

In the first level of analysis of the internal environment, the organisation's corporate govermance addresses the CSR policies equitable so that it matches the context of sustainability and this is followed by an explanation of its Carbon Emission Reduction Strategies. The second level of analysis presents the external environment with regard to budgetary and regulatory factors/or indices, and the last presents the geographical politics that are involved in global environmental sustainability.

4.1. Internal Environment and Corporate Governance and CSR

Sustainability reports frequently draw on the importance of corporate governance (CG) in implementing and monitoring companies' strategies. Terms such as "monitoring", "alignment of interests", and "convergence of interests" appear consistently across various sections of the report, suggesting that the company seeks to convey and reinforce the message that sustainability is a strategic priority. The report states that "CG at Air Line organisation is carried out by interrelated bodies, ensuring the convergence of interests and aligning actions with the company's values". This statement is strengthened by detailing the involvement of statutory bodies, such as the Audit Committee, the ESG Committee, and the Board of Directors, alongside non-statutory committees, such as the Social and Environmental Responsibility Committee. The goals and responsibilities of the current members should be streamlined. This highlights the robust governance structure, which places high importance on socio-environmental matters, conveys that CG underpins alignment between stakeholders' interests and ESG practices, consistent with the findings of Qian and Schaltegger (2017).

Additionally, the company's governance structure is strategically positioned as a control and monitoring mechanism for ESG targets. The ESG Committee is highlighted as one of the main bodies responsible for continuously monitoring sustainability practices and ensuring their alignment with national and international policies. This aligns with Kotler and Lee (2005), who argue that CG is crucial in aligning CSR objectives with the company's sustainability strategy.

Although CG is portrayed as a guiding mechanism for a company's strategies and culture, preserving the image of sustainable commitment, a latent tension exists between socio-environmental development goals and financial concerns, such as shareholder returns. This tension is exemplified by the mention of the Compensation Committee, whose purpose is to link executive compensation to the company's strategic objectives. According to Oyewo (2023), effective governance mechanisms such as integrating ESG criteria into executive compensation are essential for ensuring rigorous monitoring of environmental practices and aligning sustainable performance with shareholder interests.

Furthermore, the control and monitoring exerted by the governance structure indicates a potential underlying tension. The ESG Committee is subordinated to the Board of Directors, which is, in turn, highly interested in the company's financial performance. This implies a message about the necessity of balancing sustainable development practices with the company's financial health. Sustainability, therefore, is viewed not only from an environmental perspective, but also from a financial perspective.

In the interview, when asked about the role of CG in promoting CSR practices and socio-environmental impacts, the executive responded:

> "I believe that we don't get anywhere without governance, right? Because if you have a good professional or a good sustainability team working in your company and the board is not aligned with this, you'll have many frustrated people wanting to leave because they'll think, 'No one cares about this here. I'm leaving.' Thus, a governance system that starts with a board that is sensitive to the issue is fundamental because the highest governance bodies of companies are those that set guidelines and priorities. (. . .) It's not even the cornerstone. It's the idea of building the house; governance is the soul of things. If there's no governance, there's nothing".

This response provides the executive's pragmatic perspective and, to a certain extent, a critical one regarding the role played by CG. He emphasises that, more than a cornerstone, governance is the essence of the business, essential for sustainability practices to function properly. His statement also highlights that should the governance structure lack true commitment and engagement with sustainable development, there is a possibility of frustration and demotivation among professionals in these areas. By commenting that these professionals might think something like "no one cares about this, I'm leaving", the executive implies that, beyond acting as a control mechanism for the Company's sustainability practices and strategies, CG also plays a significant role in employee motivation.

The report briefly outlines business risks and actions to mitigate or eliminate potential challenges, such as preparing for interest rate fluctuations. However, socio-environmental risks and their potential impacts are only defined. In the interview, the executive asserted that governance is essential for strategically positioning the company before its shareholders and rating/certification agencies assess its preparedness for regulatory risks, fuel price increases, and other factors. Although business risks are mentioned in the report, the relationship between these risks and CG monitoring has not been explored in depth.

The executive's comment that "having a directive from senior leadership is essential for course correction, auditing, and assessing whether established goals have been met" exemplifies his view that governance should operate through continuous monitoring and adjustment. This stance suggests a more pragmatic and less idealised view of governance, emphasising the need for alignment with shareholders, regulatory bodies, suppliers, and other stakeholders. This perspective is not always evident in the values and mission statements presented in company reports and other official documents.

4.2. Carbon Emission Reduction Strategies

The Company's decarbonisation strategy is guided by medium- and long-term goals aligned with the United Nations' Sustainable Development Goals (SDGs). As highlighted by Bebbington and Larrinaga (2014), the sustainability report is a signal to the commitment to achieving carbon neutrality by 2045, relying on strategies such as Sustainable Aviation Fuel (SAF) and the Fuel Efficiency Program (PEC). According to data from a report published by the company, in 2023, the PEC was responsible for saving over 93 million litres of jet fuel and reducing approximately 235,000 tons of CO_2.

Additionally, the Company has adopted operational strategies to reduce carbon emissions, including fleet renewal and route optimisation. However, although operational efficiency is important, it has limitations in terms of achieving carbon-neutrality targets. According to the interviewee, a significant part of emission reductions depends on using biofuels.

> "Operational efficiency doesn't deliver much, but it's super important. 5% is little, but it's also very relevant. Better to have a 5% reduction than 5% in carbon credits. (...) Currently, the main strategy for emission reduction is fleet renewal. However, there is a limit to what the most modern aircraft and its fuel efficiency can deliver. Thus, I must turn to biofuels to achieve this drastic reduction. Then, 60 to 70% of my reduction will have to come from biofuels".

The comparison between operational efficiency and carbon credits suggests that while both contribute to achieving sustainability goals, the reduction achieved through operational efficiency, even if modest, is more significant than compensation through carbon credits. In another part of the interview, the interviewee commented that compensation should be a last resort, reinforcing that the focus should remain on emission reduction. This stance strengthens the long-term vision and sustainable emissions reduction practices as superior to and more important than carbon credits for meeting sustainability and carbon-neutral goals.

However, the phrase "but there's a limit to what the most modern aircraft and fuel efficiency can deliver" highlights the limitations of operational efficiency strategies, indicating that, although important, they are insufficient to reduce carbon emissions significantly. Thus, as a case-based research envisaging theory building, toeing Pagell and Wu (2009), this study asserts that:

*P*2—Airline environmental controls that enhances operational efficiency is not enough to reduce carbon emissions.

Thus, by mentioning that biofuels are crucial for achieving a significant reduction in emissions, the interviewee recognises that achieving the target depends not only on internal strategies developed by the company but also on external factors, such as the availability and cost of SAF. By stating that approximately 60–70% of the emission reduction target will depend on the use of biofuels, it becomes implicit that meeting these goals is contingent on external factors.

At various points in the interview, the executive presented perspectives on the challenges of making biofuels viable in Brazil, noting that SAF is still unavailable in the country and that if this option is not feasible by 2028, the company will have to resort to the carbon credit market. The interviewee believes this "could generate a significant impact on operational costs". An analysis of these comments revealed a conflict between the ideal of sustainability being pursued and the company's financial needs. Concerns were also noted regarding the high costs that may arise from carbon offsetting, and the mention of the year 2028 suggests a sense of urgency in making the SAF viable. Thus, sustainability must be economically feasible for effective integration.

4.3. External Environment: Fiscal and Regulatory Environment

The sustainability report is concise in terms of fiscal and regulatory aspects. It mentions only the construction of the regulatory framework and the unavailability of SAF in Brazil, with issues still needing further development. The Company notes that one of its consolidating action fronts is advocacy with regulators and legislators, aiming to contribute technical and scientific data along with future scenario modeling.

Although this topic is minimally explored in the report, the executive interview suggests that the fiscal and regulatory environment is more complex than it appears and currently represents one of the company's main challenges in its decarbonisation strategy. As in the report, the interviewee highlights the need for advocacy with regulators, asserting that the company seeks to provide detailed information to ensure that "SAF [sustainable aviation fuel] does not cost five times more than traditional fuel", and that Brazil's tax reform fully relieves the entire biofuel production chain.

> "On our side, we also push for information to regulators (...) During the tax reform process, this should be included in the reform because we need to relieve the entire supply chain. It is not only the airline being relieved; everyone needs to be relieved for this to be worthwhile because today the numbers do not add up. Despite having phenomenal potential in raw material stock for biofuel production, Brazil is currently facing an extremely unfavourable economic-political scenario".

Critical discourse analysis revealed a conflict between Brazil's productive potential and its limitations, as highlighted in the interviewee's remarks. There is a clear emphasis on the need for a fiscal policy that extends beyond the isolated interests of airlines and benefits the entire production chain. In this sense, tax relief is positioned as an essential tool for attracting investment and making biofuel production economically viable in Brazil.

The informal expression "today the numbers don't add up" reflects the interviewee's skepticism regarding the financial viability of domestically producing biofuel. This phrase implies a subtle critique of inadequate financial support and government incentives. The statement "despite having a phenomenal potential in raw material stock" underscores a contrast between the available resources and the country's unfavourable economic scenario, revealing a tone of frustration with the political and financial obstacles limiting Brazil's advancement in biofuel production.

Another statement by the interviewee reinforces the uncertainties surrounding price and volume estimates, reflecting an unstable environment that discourages investment in biofuel production.

> "We ask potential manufacturers if they have price estimates. They don't because they don't have volume estimates for actual consumption".

As previously mentioned, this statement highlights the uncertainty surrounding biofuel demand and supply, implicitly underscoring the need for a fiscal environment that facilitates cost reductions and enables SAF use in Brazil.

4.4. Global Geopolitics

The report does not delve deeply into geopolitical issues; it only mentions that conflicts in Ukraine and Israel directly impact the operational costs and stability of the fuel supply chain. However, when asked about the primary challenges to reducing carbon emissions, the interviewee highlighted geopolitical issues as one of the major barriers, alongside fiscal and regulatory concerns.

In his view, the executive stated that international policy frameworks are not neutral and are heavily influenced by European agenda. According to him, decarbonisation rules are applied uniformly on a global scale, disregarding the historical differences in carbon emissions across various world regions. His remarks showed a tone of frustration and a sense of injustice towards Brazil and Latin America. To illustrate this perspective, he used the analogy: "it's as if everyone had lunch at [a well-regarded, expensive restaurant in Brazil] (...) and then split the bill equally". He argued that it is unfair for countries with lower historical emissions, such as Brazil, to have the same standards as major carbon emitters, such as the United States and Europe.

Another point raised by the interviewee was the booking claim mechanism, which would allow the "environmental attribute" of a biofuel to be sold or transferred without requiring the fuel's physical delivery to the buyer.

> "(...) there is a geopolitical challenge... I think this geopolitical challenge is significant. A more concrete example is one of the ways to make biofuels viable for aviation worldwide. This is called a booking claim. Many negotiations must take place to have a booking mechanism that works internationally. Again, it would favour countries like Brazil, China, Australia, countries with strong agriculture that could be very competitive on the international stage".

This statement reveals the interviewee's pragmatic perspective and his view that although the booking claim mechanism holds potential, its implementation faces geopolitical challenges, including protectionism and negotiation barriers. The interviewee's remarks reflect an implicit tension between frustration over negotiation challenges and a glimmer of hope that countries with strong agricultural sectors could benefit from and achieve greater global competitiveness.

In the interviewee's discourse, the booking claim is presented as more than just an environmental solution to democratise access to the carbon credit market; it is a mechanism whose viability depends on intensive negotiations, multilateral agreements, and overcoming protectionist barriers.

5. Conclusions

The analysis of the reports and interview suggests that the traditional U-shaped Environmental Kuznets Curve (EKC) is not corroborated in the case of the company studied. Although the company actively seeks to align economic growth with sustainable development, its isolated actions are insufficient to support traditional EKC theory. Reducing carbon emissions and environmental degradation strongly depends on appropriate public policies, fiscal incentives, and international cooperation.

The study responded to *R1* on how is the CSR mediating C02 policies effects on Environmental Kuznets Curve in Brazil toeing Case Study of an Airline Company. In the same vein, this study provides a comprehensive qualitative analysis of the applicability of the Environmental Kuznets Curve (EKC) in a Brazilian airline and the effects of mediating policies through Corporate Social Responsibility (CSR).

As a theoretical implication the results of the study revealed that the relationship between CSR and CG does not necessarily corroborate the traditional EKC theory, which predicts an inverted U-shape. Instead, the findings suggest the existence of a trade-off between environmental protection and social equity, indicating that CSR mediation in choices to reduce CO_2 emissions can generate different effects, depending on the national context and governance practices adopted. These results challenge the assumption that once economic growth reaches a certain point, it improves environmental quality.

As a practical implication of this study, deriving a series of findings that indicate that EKC can be positively stimulated when CSR policies are effectively adopted under the influence of well-structured CG and favorable government intervention. These findings suggest that well-structured government and corporate policies can encourage companies to balance sustainability and economic growth. However, it is important for CG to prioritise a balance between economic, financial, social, and environmental aspects.

Although the insights provided by this study are relevant, the generalizability of the results may be limited because of the specificities of the company analysed and the context in which it operates. Future research should focus on expanding the sample to include several companies in the aviation sector, both in Brazil and in other countries, to verify whether the results are consistent in different contexts. In addition, this study

can be expanded to other economic sectors to assess whether the results vary by sector. Moreover, one perspective worthy of analysis is the ethical challenges of CG. Certainly, this will generate a rethinking of the EKC and investment analysis for society.

By expanding the EKC analysis to a qualitative paradigm, this study highlights the importance of integrating CSR and CG practices to balance social and environmental demands. This study also highlights the need for policies encouraging companies to contribute to sustainable development without compromising financial health. The results expand the concerns of academia, policymakers, and the ongoing syllabus for the education and growth of social well-being. Collaboration among these agents is becoming increasingly necessary to advance sustainable development. Additionally, this may promote an in-depth examination of the quality of the literature because of new directions for business and national systems.

5.1. Contributions

Contributions of this study are:

The aviation industry in Brazil is central to the discourse of Brazil's commitment to 100%offset of carbon emissions by 2025 worthy of analysis. The initial plan is to have a-neutral growth in 2027, although it has already transitioned to the use of advanced biofuels. Airline companies are central in this goal; therefore, the presentation of an airline's CG and how it is mitigating the effect of CO_2 through its CSR using EKC calls attention. The paper contrasts the assumption that economic growth automatically results in improvements in environmental quality. The tension between sustainability and financial growth requires corporate governance that would prioritise a balance between environmental and economic cum financial factors. Need for policies that would aid companies, especially, airlines, to contribute to sustainable development without compromising the financial health of the organisation. Ex-ante literature growth on Environmental Kuznet Curve by adopting a qualitative paradigm in a field that has been predominantly explored through quantitative approaches.

5.2. Limitations

Although this study highlighted many positive aspects of the CSR mediating CO_2 policies effects on environmental Kuznets Curve in Brazil, we may also stress limitations of the study that is naturally bound by the qualitative paradigm toeing a case study and drawing on discursivity. Also, the airline scenario and context (Brazil) are limiting elements themselves. Notwithstanding, this could be improved by advancing on varieties of approaches for expatiation. In other words, policymakers, professionals and scholars may find it interesting to explore in more depth, potentially yielding distinct results and interpretations.

Author Contributions: Conceptualization, J.O.I. and J.L.; methodology, J.O.I., J.L. and S.d.S.E.; software, J.L. and S.d.S.E.; validation, J.O.I.; analysis, J.L.; investigation, J.L. and S.d.S.E.; resources, J.O.I.; data curation, F.A.; writing—original draft preparation, J.O.I. and F.A.; writing—review and editing, J.O.I.; visualization, F.A.; supervision, J.O.I.; project administration, J.O.I.; funding acquisition, J.O.I. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from the participant involved in the study.

Data Availability Statement: Data is contained within the article.

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

References

Alam, M. M., Murad, M. W., Noman, A. H. M., & Ozturk, I. (2016). Relationships among carbon emissions, economic growth, energy consumption and population growth: Testing environmental Kuznets curve hypothesis for Brazil, China, India and Indonesia. *Ecological Indicators*, *70*, 466–479. [CrossRef]

Assis, J. P. L., Imoniana, J. O., Kassai, J. R., Cornacchione, E. B., & Reginato, L. (2023). Relationships between corporate social responsibility, sustainability assurance, and adoption of integrated reporting in public sector. *Creative Education*, *14*(11), 2239–2264. [CrossRef]

Audet, R. (2016). Transition as discourse. *International Journal of Sustainable Development*, *19*(4), 365–382. [CrossRef]

BBC. (2020). *What does trump actually believe on climate change?* Available online: https://www.bbc.com/news/world-us-canada-51213003 (accessed on 14 April 2025).

Bebbington, J., & Larrinaga, C. (2014). Accounting and sustainable development: An exploration account. *Accounting, Organizations and Society*, *39*(6), 395–413. [CrossRef]

Beek, M. (2019). *The environmental Kuznets curve: Examining the relationship between income and technology-adjusted consumption-based CO_2 emissions* [Master's dissertation, Department of Economics History, LU]. Available online: https://lup.lub.lu.se/student-papers/search/publication/8984944 (accessed on 14 April 2025).

Brennan, L., Binney, W., McCrohan, J., & Lancaster, N. (2011). Implementation of environmental sustainability in business: Suggestions for improvement. *Australasian Marketing Journal*, *19*(1), 52–57. [CrossRef]

Bryman, A., & Cassell, C. (2006). The researcher interview: A reflexive perspective. *Qualitative Research in Organizations and Management*, *1*, 41–55. [CrossRef]

Carrero, G. C., Fearnside, P. M., do Valle, D. R., & de Souza Alves, C. (2020). Deforestation trajectories on a development frontier in the Brazilian amazon: 35 years of settlement colonization, policy and economic shifts, and land accumulation. *Environmental Management*, *66*, 966–984. [CrossRef]

Cordeiro, L. F. A., Santos, G. M., Lima, W. G., Silva, R. R., & Santos, L. A. (2022). Energia nuclear: Uma análise bibliométrica dos últimos dez anos (2012–2022). *Revista Ibero-Americana de Ciências Ambientais*, *13*, 193–206. [CrossRef]

Delmas, M. A., Nairn-Birch, N., & Lim, J. (2015). Dynamics of environmental and financial performance: The case of greenhouse gas emissions. *Organization and Environment*, *28*(4), 374–393. [CrossRef]

de Miranda Ribeiro, F., & da Silva, G. A. (2010). Life-cycle inventory for hydroelectric generation: A Brazilian case study. *Journal of Cleaner Production*, *18*, 44–54. [CrossRef]

Desai, R., Raval, A., Baser, N., & Desai, J. (2022). Impact of carbon emission on financial performance: Empirical evidence from India. *South Asian Journal of Business Studies*, *11*, 450–470. [CrossRef]

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, *14*, 532–550. [CrossRef]

Elkington, J. (1998). *Cannibals with forks: The triple bottom line of 21st century business*. New Society Publishers.

Epstein, M. J., Buhovac, A. R., & Yuthas, K. (2015). Managing social, environmental and financial performance simultaneously. *Long Range Planning*, *48*(1), 35–45. [CrossRef]

Fairclough, N. (1995). *Critical discourse analysis*. Longman.

Flórez-Orrego, D., Silva, J. A. M., & Oliveira, S., Jr. (2014). Renewable and non-renewable exergy cost and specific CO_2 emission of electricity generation: The Brazilian case. *Energy Conversion and Management*, *85*, 619–629. [CrossRef]

Freire, F., da Silva, N. O., & de Oliveira, V. R. F. (2023). Economic growth and greenhouse gases in Brazilian states: Is the environmental Kuznets curve applicable hypothesis? *Environmental Science and Pollution Research*, *30*, 44928–44942. [CrossRef] [PubMed]

Gallego-Alvarez, I., Segura, L., & Martinez-Ferrero, J. (2015). Carbon emission reduction: The impact on the financial and operational performance of international companies. *Journal of Cleaner Production*, *103*, 149–159. [CrossRef]

Goklany, I. M. (1999). *Claring the air: The real story of the war on air pollution*. Cato Institute.

Grossman, G. M., & Krueger, A. B. (1995). Economic growth and the environment. *The Quarterly Journal of Economics*, *110*(2), 353–377. [CrossRef]

Guo, X., & Shahbaz, M. (2024). The existence of environmental Kuznets curve: Critical look and future implications for environmental management. *Journal of Environmental Management*, *351*, 119648. [CrossRef]

Imoniana, J. O., de Souza Freire, F., & Perera, L. C. J. (2022). The sustainability assurance: Rigidity, boundaries and labour division. *Account and Financial Management Journal*, *7*(12), 3000–3018. [CrossRef]

Journalism-Cultura. (2023). *Tragedy at rio grande do sul*. Available online: https://www.youtube.com/watch?v=MPueKkOTeXM (accessed on 14 April 2025).

Ketokivi, M., & Choi, T. (2014). Renaissance of case research as a scientific method. *Journal of Operations Management*, *32*(5), 232–240. [CrossRef]

Kılıç, M., & Kuzey, C. (2019). The effect of corporate governance on carbon emission disclosures: Evidence from Turkey. *International Journal of Climate Change Strategies and Management*, *11*(1), 3553. [CrossRef]

Kotler, P., & Lee, N. (2005). Best of breed: When it comes to gaining a market edge while supporting a social cause, "corporate social marketing" leads the pack. *Social Marketing Quarterly*, *11*(3–4), 91–103. [CrossRef]

Kvale, S., & Brinkmann, S. (2009). *InterViews: Learning the craft of qualitative research interviewing*. Sage Publications.

Leal, P. H., & Marques, C. M. (2022). The evolution of the environmental Kuznets curve hypothesis assessment: A literature review under a critical analysis perspective. *Heliyon*, *8*(11), e11521. [CrossRef] [PubMed]

Lewandowski, S. (2017). Corporate carbon and financial performance: The role of emission reductions. *Business Strategy and the Environment*, *26*(8), 1196–1211. [CrossRef]

Lin, B., & Ma, R. (2022). Towards carbon neutrality: The role of different paths of technological progress in mitigating China's CO_2 emissions. *Science of The Total Environment*, *813*, 152588. [CrossRef]

Lipford, J. W., & Yandle, B. (2010). Environmental Kuznets curves carbon emissions, and public choices. *Environment and Development Economics*, *15*(4), 417–438. [CrossRef]

Ministério de Portos e Aeroportos. (2022). *Brazil signs commitment for sustainable aviation with ICAO*. Available online: https://www.gov.br/anac/en/news/2022/brazil-signs-commitment-for-sustainable-aviation-with-icao#:~:text=ICAO%20ASSEMBLY,transfer%20and%20access%20to%20financing (accessed on 14 April 2025).

Moy-ud-Din, K., Shahaz, M., & Du, A. M. (2025). Corporate social responsibility and climate change mitigation: Discovering the interaction role of green audit and sustainability committee. *Corporate Social Responsibility and Environmental Management*, *32*(1), 1198–1212. [CrossRef]

Nascimento, A. M., & Reginato, L. (2008). Disclosure of accounting information, corporate governance and sorganisational control: A necessary relationship. *Revista Universo Contábil*, *4*(3), 25–47.

Natow, R. S. (2019). The use of triangulation in qualitative studies employing elite interviews. *Qualitative Research*, *20*(2), 160–173. [CrossRef]

Naveed, A., Ahmad, N., Aghdam, R. F. Z., & Menegaki, A. N. (2022). What have we learned from Environmental Kuznets Curve hypothesis? A citation-based systematic literature review and content analysis. *Energy Strategy Reviews*, *44*, 100946. [CrossRef]

Nuroglu, E., & Kunst, R. M. (2018). Kuznets and environmental Kuznets curves for developing countries. In *Industrial policy and sustainable growth, sustainable development*. Springer-Nature. [CrossRef]

Oliveira, D. K. M., Imoniana, J. O., Slomski, V., Reginato, L., & Slomski, V. G. (2022). How do internal control environments connect to sustainable development to curb fraud in Brazil? *Sustainability*, *14*, 5593. [CrossRef]

Orubu, C. O., & Omotor, D. G. (2011). Environmental quality and economic growth: Searching for environmental Kuznets curves for air and water pollutants in Africa. *Energy Policy*, *39*(7), 4178–4188. [CrossRef]

Oso, S., & Alakija, F. (2008). Corporate social responsibility in the Nigerian business sector. In L. Oso, & Y. Ajayi (Eds.), *Corporate Social Responsibility of Business–Principles, Practice and Perspectives* (pp. 45–65). Coordinated by the Nigerian Institute of Public Relations (NIPR), Ogun State. Heron Strategy Publishers.

Oyewo, B. (2023). Corporate governance and carbon emissions performance: International evidence on curvilinear relationships. *Journal of Environmental Management*, *334*, 117474. [CrossRef]

Pagell, M., & Wu, Z. (2009). Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. *Journal of Supply Chain Management*, *45*(2), 37–56. [CrossRef]

Pêcheux, M. (1997). Análise Automática do Discurso (ADD-69). In F. Gadet, & T. Hak (Eds.), *Por uma Análise Automática do Discurso: Uma Introdução à Obra de Michel Pêcheux* (pp. 61–162). Editora UNICAMP.

Pincheira, R., & Zuniga, F. (2020). Environmental Kuznets curve bibliographic map: A systematic literature review. *Accounting & Finance*, *61*(S1), 1931–1956.

Putri, A. M. D., Budhi, M. K. S., Utama, M. S., & Yasa, I. G. W. M. (2019). The influence of government role, community participation and social capital on the quality of destination and community welfare in the tourism village of badung regency province of Bali. *Russian Journal of Agricultural and Socio-Economic Sciences*, *92*(8), 235–251. [CrossRef]

Qian, W., & Schaltegger, S. (2017). Revisiting carbon disclosure and performance: Legitimacy and management views. *The British Accounting Review*, *49*(4), 365–379. [CrossRef]

Qu, S. Q., & Dumay, J. (2011). The qualitative research interview. *Qualitative Research in Accounting & Management*, *8*(3), 238–264.

Selden, T. M., & Song, D. (1994). Environmental quality and development: Is there a Kuznets curve for air pollution emissions? *Journal of Environmental Economics and Management*, *27*(2), 147–162. [CrossRef]

Shahbaz, M., Lean, H. H., & Shabbir, M. S. (2012). Environmental Kuznets curve hypothesis in Pakistan: Cointegration and granger causality. *Renewable and Sustainable Energy Reviews*, *16*(5), 2947–2953. [CrossRef]

Stern, D. I. (2004). The rise and fall of the environmental Kuznets curve. *World Development*, *32*(8), 1419–1439. [CrossRef]

Trinks, A., Mulder, M., & Scholtens, B. (2020). An efficiency perspective on carbon emissions and financial performance. *Ecological Economics*, *175*, 106632. [CrossRef]

Weissert, L. F., Salmond, J. A., & Schwendenmann, L. (2014). A review of the current progress in quantifying the potential of urban forests to mitigate urban CO_2 emissions. *Urban Climate*, *8*, 100–125. [CrossRef]

World Bank. (2003). *World development indicators*. New York. Available online: https://scholar.google.com/scholar?q=World%20Bank,%202003.%20World%20Development%20Indicators.%20New%20York (accessed on 14 April 2025).

Yin, R. (2003). *Case study methods*. Sage Publications.

Yoro, K. O., & Daramola, M. O. (2020). CO_2 emission sources, greenhouse, gases, and the global warming effect. In *Advances in carbon capture* (pp. 3–28). Woodhead Publishing.

Yu, P., Hao, R., Cai, Z., Sun, Y., & Zhang, X. (2022). Does emission trading system achieve the win-win of carbon emission reduction and financial performance improvement?—Evidence from Chinese A-share. *Journal of Cleaner Production*, *333*, 130121. [CrossRef]

Yunus, D. E., Shi, W., Sohrabi, S., & Liu, Y. (2016). Shear induced alignment of short nanofibers in 3D printed polymer composites. *Nanotechnology*, *27*, 495302. [CrossRef]

Zambrano-Monserrate, M. A., Valverde-Bajaña, I., Aguilar-Bohórquez, J., & Mendoza-Jiménez, M. (2016). Relationship between economic growth and environmental degradation: Is there an environmental evidence of Kuznets curve for Brazil? *International Journal of Energy Economics and Policy*, *6*(2), 208–216.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.