INTERNATIONAL JOURNAL OF RESEARCH & PUBLICATION

ISSN(online): 2667-5769
Volume 08 Issue 01 April 2025
DOI: 10.5281/zenodo.15344019

Carbon Disclosure as a Predictor of Firm Performance: A Systematic Literature Review

Mahesh Chand Garg[1] , Simran Khurana[2],

Abstract

Carbon emissions and global warming have become important problems of corporate environmental performance since the Kyoto Protocol went into force in February 2005. Carbon disclosure is a recently developed notion that has emerged in the past several years. The purpose of this review paper is to provide a complete understanding of the financial implications of carbon performance and disclosure. This review paper is divided into two sections namely carbon performance with firm performance and second one is carbon disclosure with firm performance. This review of literature concludes that carbon disclosure is new topic in business research. The correlation between carbon performance and carbon disclosure resulted in a favourable influence on the overall performance of the company. Carbon performance and carbon disclosure is also positively connected.

Keywords: *carbon emission, carbon performance, carbon disclosure, firm performance, greenhouse gas emission.*

---

1 Professor, Haryana School of Business, Guru Jambheshwar University of Science & Technology, Hisar, Haryana., E-mail: mc_garg@yahoo.com
2Research Scholar, Haryana School of Business Guru Jambheshwar University of Science & Technology, Hisar, Haryana. E-mail: simikhurana1920@gmail.com

1. Introduction

On December 11th, 1997, the Kyoto Protocol (KP) was adopted as an addendum to the United Nations Framework Convention on Climate Change. This protocol includes legally obligatory objectives of greenhouse emissions for industrialised nations in order to limit human intervention with the climate system (Salvia *et al*., 2004). The main aim of Kyoto Protocol is reducing the greenhouse gas emissions and distribution the costs of climate

change (Leggett, 2020). The Kyoto agreement has been formally approved by several nations, mandating that enterprises conform to the revised regulations stated in the agreement (Alvarez, 2012). The industrialised nations made a commitment to implement a series of steps to cut greenhouse gas emissions at that time. Gupta (2010) stated that, "In order to promote sustainable development, the agreement states that countries must decrease their total emissions of gases by a minimum of 5.2 percent below the levels recorded in 1990 during the initial commitment period (2008-2012) of the Kyoto Protocol". The countries, either individually or collectively, made sure that their combined human-caused emissions of CO_2 and other greenhouse gases did not above their predetermined limits. These limits are determined based on their specific agreements to reduce and restrict emissions (Zhang, 2000). Companies, being integral to society, are currently confronted with the task of diminishing emissions in order to alleviate climate change (Weinhofer and Hoffmann, 2010). Additionally, they encountered difficulties about the potential effects of climate change on their operations, as the rise in global temperatures has led to a buildup of emissions of greenhouse gas, particularly carbon dioxide (Botzen *et al*., 2008).

Carbon Dioxide, one of the greenhouse gases, is the main gas responsible for the changing climate and that leads to global warming (Demirbas, 2006). Due to a change in the composition of greenhouse gases in the atmosphere, it has become the major environmental concern (Rosa and Dietz, 2012). Climate change threatens both the environment and people on a worldwide scale, in both industrialised and developing nations, the problem of climate change is increasingly important to society (The Emissions Gap Report, 2015). While reducing carbon emissions is essential to achieving its goal of slowing down climate change, it is not clear how this will effect businesses' day-to-day operations and financial implications.The rate of growth in carbon emissions has been accelerated by the increased usage of non-renewable energy sources (Banday and Aneja 2020).The Intergovernmental Panel on Climate Change (IPCC) came to the conclusion that human activity causes global warming. In light of this, global warming has elevated to a top concern for people all around the world (Saka and Oshika, 2014). Companies are now disclosing information on GHG and climate change in order to uphold their credibility with internal management and external stakeholders due to the subject matter's growing importance (Momin *et al*., 2017).

The origins of carbon disclosure can be traced back to the late 1990s with signing of the Kyoto Protocol in 1997, which established international commitments to reduce greenhouse

gas (GHG) emissions (Kolk *et al*., 2008). In 1998, the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) launched the GHG Protocol, providing standardized methods for GHG accounting (Green, 2010). The Carbon Disclosure Project (CDP) was established in 2000 as a response to growing investor demand for climate-related information. Initially focused on GHG emissions, CDP has since expanded its scope (Kolk *et al*., 2008). As of 2022, over 18,700 companies submitted disclosures through CDP, reflecting a substantial increase in participation since the Paris Agreement in 2015 (Hope and Sargiacomo, 2024).

United Nations Framework Convention on Climate Change (UNFCCC) was established on March 21, 1994, with the primary objective of mitigating the adverse impacts of human activities on the Earth's climate system (Tompkins and Amundsen, 2008). In the past decade, there has been a growing apprehension among governments, policymakers and international organizations regarding the escalating pace of climate change (Sahu, 2022). Many economic, business and social areas have been affected by climate change (Linnenluecke *et al*., 2013). To keep anthropogenic dangers (disasters caused by people's actions or lack of action) from messing up the climate system, governing bodies have come up with plans to reduce greenhouse gas levels (Hornsey and Fielding, 2020). All countries in the world have come up with and put into place a wide range of market and non-market-based policies to convince businesses regarding the need to cut down on their carbon emissions (Okereke and Russel, 2010). People are paying a lot of attention to environmental disclosure as an important area of study, especially when it comes to the release of carbon-related data by government agencies (Mia *et al*., 2021). This is mostly because of the negative effects of climate change. The Kyoto Protocol made it easier to report carbon traces, which led to the rise of carbon accounting (Tuesta *et al*., 2022). In 2015, the Paris Agreement was the big step taken towards the fight against global warming (Dumay *et al*., 2017). Since then, all companies in the world have been required to disclose information about their emissions of carbon.

1.1 Carbon Performance

Carbon performance is the result of carbon-related managerial activities. Carbon performance refers to a company's ability to manage and reduce its carbon emissions and overall environmental impact (Velte *et al*., 2020). Accordingly, to Greenhouse Gas Protocol Corporate Standard, “A company’s greenhouse gas emissions are classified into three scopes.

Scope 1 is direct greenhouse gas emissions that occur from sources that are owned and controlled by companies. Scope 2 accounts for greenhouse gas emissions that a company causes indirectly and come from where the energy it purchases and uses is produces. Scope 3 encompasses emissions that are not produced by the company itself and are not the result of activities from assets owned or controlled by them, but by those that it is indirectly responsible for up and down its value chain". Tracking these emissions helps businesses to understand where their emissions come from and find opportunities to reduce their carbon footprints (Busch and Lewandowski, 2018). In today's world, there is a growing concern about the effects of carbon dioxide and other greenhouse gas emissions on climate change. As a result, individuals, businesses and governments are increasingly focused on understanding and improving their carbon performance (Raihan and Tuspekova, 2022).

1.2 Carbon Disclosure

Carbon disclosure refers to the process of measuring, reporting, and disclosing information about an organization's greenhouse gas emissions and its strategies for mitigating climate change (Depoers *et al.*, 2016). Demaria and Rigot (2021) stated that "This disclosure typically done through the completion of standardized surveys or questionnaires, such as those provided by organizations like the Carbon Disclosure Project (CDP) and the Task Force on Climate-related Financial Disclosures (TCFD)". The purpose of carbon disclosure is to increase transparency and accountability in relation to an organization's carbon footprint and its environmental impact (Matisoff *et al.*, 2013). It helps stakeholders, including investors, customers, and the public to understand how a company is addressing climate change and whether it is taking steps to reduce its greenhouse gas emissions or not. This information can also be used to compare and benchmark an organization's performance against industry peers and to make informed decisions regarding investment, procurement and sustainability initiatives (Sprengel and Busch, 2011).

1.3 Firm Performance

In today's dynamic business environment, the evaluation of a firm's performance is crucial for assessing its competitiveness, sustainability and success in the market (Almashhadani and Almashhadani, 2023). Firm performance refers to the efficiency and effectiveness with which a company uses its resources to achieve its goals and create value for stakeholders (Charles and Ochieng, 2023). It is a multifaceted concept influenced by various internal and external factors. The measurement of financial performance is divided into following two parts:

(i) Accounting based measures

Accounting-based measures of firm performance are quantitative assessments that rely on financial data recorded in a company's accounting records (Ricca *et al*., 2023). These accounting-based measures provide insights into various aspects of a company's financial health, profitability, efficiency, and overall effectiveness in generating value for shareholders (Alsaifi *et al*., 2020). The important accounting-based measures are:

(a) Return on Assets (ROA): ROA is a financial metric employed to assess the company's profitability concerning its total assets. It indicates how efficiently a company utilizes its assets to generate earnings (Saputra, 2022). A higher ROA indicates better asset utilization and profitability, meaning the company is more efficient in generating earnings from its assets (Akinleye and Dadepo, 2019).

(b) Return on Equity (ROE): ROE indicates the efficiency with which a company generates profits from the shareholders' investment. A higher ROE signifies that the company is effectively using shareholder funds to generate profits, while a lower ROE indicate that the company is less efficient in utilizing shareholder equity to produce returns (Saputra, 2022).

(ii) Market based measures

Market-based measures are financial metrics that assess a company's performance or value in relation to its stock market performance or investor valuation (Lee, 2014). These measures reflect how the market perceives a company's prospects, growth potential, and overall worth (Shi, 2016). Following are the market base measures:

(a) Market Capitalization: Market capitalization is a metric that quantifies the overall worth of a company's publicly traded shares in the stock market (Alsaifi *et al*., 2020). The calculation involves multiplying the prevailing market price of an individual share by the aggregate number of shares that are currently in circulation (Hall, 2001). Market capitalization indicates the public market's valuation of a company and it is widely used to compare companies of different sizes (Bai *et al*., 2004).

(b) Tobin Q: Tobin Q is a financial metric used to assess a company's valuation by comparing the market value of its assets to their replacement cost (Butt *et al*., 2023). This ratio helps investors to determine whether a company's stock is undervalued or overvalued relative to the cost of its assets (Ali *et a*l., 2016).

2. Research Objectives

To understand the concept of carbon performance, carbon emission disclosure and its impact on firm performance. Further, to suggest the research gap for future studies. Our key research questions were:

1) Does the firm experience positive financial outcomes as a result of carbon performance and disclosure?

2) To what extent are carbon performance and disclosure positively correlated?

3. Research Methodology

The study of carbon performance and disclosure is based on empirical research that involves a wide range of data, research designs, theoretical methods, and analytical methodologies. As a result, there are multiple separate bodies of literature on this topic. Based on this foundation, we determined the precise terms to utilize for the informational search. We conducted a search across worldwide databases, namely Web of Science, Google Scholar (which presumably encompasses all articles from the Scopus database without separate searching), the Social Science Network (SSRN), and Science Direct. The search query consisted of pertinent keywords "carbon performance" and "carbon disclosure" in relation to "firm performance". This literature study encompasses a compilation of 50 research papers sourced from various scholarly magazines, spanning the publication period of 2005 to 2023.

Table 1: Segregation of Research Articles

Source Name	Number of Articles
Emerald	14
Elsevier	4
Taylor & Francis and Sage	2
Wiley and Springer	6
SSRN and MDPI	6
Others	18

3. Literature Review

This review of literature on carbon performance, carbon disclosure and firm performance is divided into two sections namely (i) Carbon performance and firm performance and (ii) Carbon disclosure and firm performance

(i) Carbon performance and firm performance

Environmental performance and carbon performance are closely related aspects of a company's sustainability efforts. While environmental performance encompasses a broader range of sustainability practices, carbon performance specifically focuses on a company's efforts to manage and reduce its carbon footprint (Velte *et al*., 2020). Analysing carbon performance can provide valuable insights into a firm's overall sustainability strategy and its potential impact on firm performance (Saka and Oshika, 2014). According to Lee *et al*. (2015), "An analysis of the existing literature regarding the relationship between firm performance and emission reduction shows that at first the literature assumed that investments to protect the natural environment provided few financial benefits to firms". Subsequently, Magness (2006). affirmed that 'strategic position may jointly cause both lower pollution levels and better financial performance'. Exiting literature found different result of the carbon performance and firm performance according to their variables. However, Hart and Ahuja (1996), Nishitani and Kokubu (2012), He *et al.* (2016), Lewandowski (2017), Ganda and Milindzo (2018), Ganda (2018), Hapsoro and Falih (2020), Sharma and Verma (2021), Makan and Kabra (2021), Toukabri and Jilani (2022), Ghose and Themjung (2023), Zheng and Jin (2023), Adu *et al.* (2023), discovered a beneficial correlation between carbon performance and its impact on firm performance. Michelon (2011) found that "Companies that convey good performance via disclosure can enhance their public image and reputation and build brand competitive advantage". To assess the impact of carbon emissions on the financial performance of corporations Kumari and Patel (2020) used multiple regression technique and found the negative relation between the variables. Similarly Desai *et al.* (2022), Alvarez, (2012), Lakar *et al.* (2022), Kumar and Firoz, (2018), Matsumura *et al.* (2014), Delmas *et al.* (2015), Oestreich and Tsiakas (2023), Butselaar (2020) also believed that there is no association between carbon performance and firm performance. Elsayed and Paton (2004), Ngwakwe and Msweli (2013), Trinks and Hille (2023) found moderating effect regarding the relationship between carbon performance and corporate performance. Hence, the above literature concluded that different authors found different result between carbon performance and corporate performance.

(ii) Carbon disclosure and firm performance

Carbon disclosures offer advantages by reducing asymmetry of information between the company and external parties, such as investors, thereby promoting the effective allocation of

limited resources (Matsumura *et al.,* 2014). According to Pitrakkos and Maroun (2020), "Firms making truthful voluntary carbon emission disclosures deliver transparent nonfinancial information to investors that inform them of future costs that may be imposed upon the firm due to its carbon emissions". Kamat and Kamat (2012) evaluate the financial accounting approaches in carbon accounting and discovered significant discrepancies in the way companies in India report emission allowances, with differing approaches leading to significant differences in financial statement disclosures. Furthermore, Choi *et al.* (2013), Bahai *et al.* (2016), Kumar and Firoz (2020) reported the extent of voluntary carbon emission disclosures and results showed that in Australia larger firms make more comprehensive carbon disclosures but in India, Japan and China some limited companied disclose information on carbon disclosure. Giannarakis *et al.* (2017) revealed that, "higher pollution levels in terms of greenhouse gas emissions effect negatively the carbon disclosure information. While a positive relationship between environmental performance and environmental disclosure level". Ganda (2018), Alsaifi *et al*. (2020), Maji and Kalita (2022) concluded that carbon emission disclosure generated a positive relationship. In contrary Sudibyo (2018) found that carbon emission disclosure was not related with firm financial performance. Moreover Sudibyo (2018), Gola *et al*. (2023) that the volume of carbon dioxide emissions had no link with firm performance, however carbon management practices had a significant connection with firm value. In the context of India Desai (2022) found that firm size, market value, profitability, leverage and industry affiliation was the major determinants of carbon disclosure.

4. Research Gap

After reviewing the studies on "carbon emission", "carbon performance", "carbon disclosure" with comparison to "firm performance" results finds that many studies have been conducted in abroad for finding the impact of carbon performance on firm performance but only a few empirical studies have been conducted in India. Furthermore, study also found that most of the studies taken data from CDP website and further research can be done through the data taken from annual reports, business and sustainability reports. Moreover, a comparative study between sectors could be a gap with the changing scenario in disclosure reforms in India. Since carbon disclosure is voluntary in India, so future researcher needs to be done a study regarding the extent of the carbon disclosure in India.

5. Conclusion

This review concludes that carbon performance is a novel area of study for academics studying companies. After reviewing the earlier studies, it has been found that there is a need to analyse the importance and role of non-financial voluntary information in the financial sector in India and it helps practically in the decision-making process of the investors, managers, and policy-makers. Moreover, the results of mostly studies indicated that carbon performance and carbon disclosure had a positive impact on firm financial performance. Companies with good carbon performance had disclosed more carbon information in comparison to companies which are highly polluted.

References

Abd Rahman, N. R., Rasid, S. Z. A., and Basiruddin, R. (2014). Exploring the relationship between carbon performance, carbon reporting and firm performance: A conceptual paper. *Procedia-Social and Behavioral Sciences*, *164*, 118-125.

Adu, D. A., Flynn, A., and Grey, C. (2023). Carbon performance, financial performance and market value: The moderating effect of pay incentives. *Business Strategy and the Environment*, *32*(4), 2111-2135.

Akinleye, G. T., and Dadepo, A. O. (2019). Assets Utilization and Performance of Manufacturing Firms in Nigeria. *International Journal of Business and Management*, 14(4), 107-115.

Ali, M. R., Lima, R. P., and Mahmud, M. S. (2016). Analyzing Tobin's Q ratio of Banking Industry of Bangladesh: A Comprehensive Guideline for Investors. *Asian Business Review*, 6(2), 85-90.

Alkurdi, A., Al Amosh, H., and Khatib, S. F. (2023). The mediating role of carbon emissions in the relationship between the board attributes and ESG performance: European evidence. *EuroMed Journal of Business*, (ahead-of-print).

Almashhadani, M., and Almashhadani, H. A. (2023). The Influence of Technological Capacity and Financial Capacity on Promoting Firm Competitiveness and Firm Performance. *Journal of Humanities, Social Sciences and Business*, 3(1), 125-141.

Alsaifi, K., Elnahass, M., and Salama, A. (2020). Carbon Disclosure and Financial Performance: UK Environmental Policy. *Business Strategy and the Environment*, 29(2), 711-726.

Alsaifi, K., Elnahass, M., and Salama, A. (2020). Carbon Disclosure and Financial Performance: UK Environmental Policy. *Business Strategy and the Environment*, 29(2), 711-726.

Alvarez, I. G. (2012). Impact of CO_2 emission variation on firm performance. *Business Strategy and the Environment*, *21*(7), 435-454.

Bahari, N. A. S., Alrazi, B., and Husin, N. M. (2016). A comparative analysis of carbon reporting by electricity generating companies in China, India, and Japan. *Procedia Economics and Finance*, *35*, 74-81.

Bai, C. E., Liu, Q., Lu, J., Song, F. M., and Zhang, J. (2004). Corporate Governance and Mmarket Valuation in China. *Journal of Comparative Economics*, 32(4), 599-616.

Banday, U. J., & Aneja, R. (2020). Renewable and non-renewable energy consumption, economic growth and carbon emission in BRICS: evidence from bootstrap panel causality. *International Journal of Energy Sector Management*, *14*(1), 248-260.

Botzen JW, Gowdy JM, Van de Bergh JM (2008). Cumulative CO_2 emissions: shifting international responsibilities for climate debt. Climate Policy 8(6): 569–576.

Busch, T., Lewandowski, S., 2018. Corporate carbon and financial performance. A meta-analysis. J. Ind. Ecol. 22, 745e759.

Butselaar, S.van (2020). The effect of carbon emissions on firm performance and the moderating effect of innovation.

Butt, M. N., Baig, A. S., and Seyyed, F. J. (2023). Tobin's Q Approximation as A Metric of Firm Performance: An Empirical Evaluation. *Journal of Strategic Marketing*, 31(3), 532-548.

Charles, M., and Ochieng, S. B. (2023). Strategic Outsourcing and Firm Performance: A Review of Literature. *International Journal of Social Science and Humanities* Research, 1(1), 20-29.

Chen, F., Ngniatedema, T., and Li, S. (2018). A cross-country comparison of green initiatives, green performance and financial performance. *Management Decision*, *56*(5), 1008-1032.

Choi, B. B., Lee, D., and Psaros, J. (2013). An analysis of Australian company carbon emission disclosures. *Pacific Accounting Review*, *25*(1), 58-79.

Datt, R. R., Luo, L., and Tang, Q. (2019). Corporate voluntary carbon disclosure strategy and carbon performance in the USA. *Accounting Research Journal*, *32*(3), 417-435.

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

Demaria, S., and Rigot, S. (2021). Corporate Environmental Reporting: Are French Firms Compliant With The Task Force on Climate Financial Disclosures' Recommendations?. *Business Strategy and the Environment*, 30(1), 721-738.

Demirbas, A. (2006). Hazardous emissions, global climate change and environmental precautions. *Energy Sources, Part B: Economics, Planning, and Policy*, *1*(1), 75-84.

Depoers, F., Jeanjean, T., and Jerome, T. (2016). Voluntary Disclosure of Greenhouse Gas Emissions: Contrasting the Carbon Disclosure Project and Corporate Reports. *Journal of Business Ethics*, 134, 445-461.

Desai, R. (2022). Determinants of corporate carbon disclosure: A step towards sustainability reporting. *Borsa Istanbul Review*, *22*(5), 886-896.

Desai, R., Raval, A., Baser, N., and Desai, J. (2022). Impact of carbon emission on financial performance: empirical evidence from India. *South Asian Journal of Business Studies*, *11*(4), 450-470.

Dumay, J., Bernardi, C., Guthrie, J., and La Torre, M. (2017). Barriers to Implementing the International Integrated Reporting Framework: A Contemporary Academic Perspective. *Meditari Accountancy Research*, *25*(4), 461-480.

Elsayed, K., and Paton, D. (2005). The impact of environmental performance on firm performance: static and dynamic panel data evidence. *Structural change and economic dynamics*, *16*(3), 395-412.

Elsayih, J., Datt, R., and Hamid, A. (2021). CEO characteristics: do they matter for carbon performance? An empirical investigation of Australian firms. *Social Responsibility Journal*, *17*(8), 1279-1298.

Ganda, F, and Milondzo, K. S. (2018). The impact of carbon emissions on corporate financial performance: Evidence from the South African firms. *Sustainability*, *10*(7), 2398.

Ganda, F. (2018). The effect of carbon performance on corporate financial performance in a growing economy. *Social Responsibility Journal*, *14*(4), 895-916.

Ganda, F. (2018). The influence of carbon emissions disclosure on company financial value in an emerging economy. *Environment, development and sustainability*, *20*, 1723-1738.

Ghadge, A., Wurtmann, H., and Seuring, S. (2020). Managing climate change risks in global supply chains: a review and research agenda. *International Journal of Production Research*, *58*(1), 44-64.

Ghose, B., Makan, L. T., and Kabra, K. C. (2023). Impact of carbon productivity on firm performance: moderating role of industry type and firm size. *Managerial Finance*, *49*(5), 866-883.

Giannarakis, G., Konteos, G., Sariannidis, N., and Chaitidis, G. (2017). The relation between voluntary carbon disclosure and environmental performance: The case of S&P 500. *International Journal of Law and Management*, *59*(6), 784-803.

Gola, K. R., Dharwal, M., Agarwal, N., and Ranjan, M. S.(2023) Does Carbon Emission Disclosures Practices Affect The Value of Firms-A Study of Select Manufacturing Firms in India. Eur. Chem. Bull, 12(4), 998-1013

Green, J. F. (2010). Private Standards in the Climate Regime: The Greenhouse Gas Protocol. *Business and Politics*, *12*(3), 1-37.

Gupta, J. (2010). A history of international climate change policy. *Wiley Interdisciplinary Reviews: Climate Change*, *1*(5), 636-653.

Halimah, N. P., and Yanto, H. (2018). Determinant of carbon emission disclosure at mining companies listed in Indonesia Stock Exchange. *KnE Social Sciences*, 127-141.

Hall, R. E. (2001). The Stock Market and Capital Accumulation. *American Economic Review*, 91(5), 1185-1202

Hapsoro, D., and Falih, Z. N. (2020). The effect of firm size, profitability, and liquidity on the firm value moderated by carbon emission disclosure. *Journal of Accounting and Investment*, *21*(2), 240-257.

Hart, S. L., and Ahuja, G. (1996). Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business strategy and the Environment*, *5*(1), 30-37.

He, Y., Tang, Q., and Wang, K. (2016). Carbon performance versus financial performance. *China Journal of Accounting Studies*, *4*(4), 357-378.

Hope, O. K., and Sargiacomo, G. (2024). "If Not Certain Be Vague": How Uncertainty about Investors' Preferences Shapes Voluntary Climate-Change Disclosure.

Hornsey, M. J. and Fielding, K. S. (2020). Understanding (and reducing) Inaction on Climate Change. *Social Issues and Policy Review*, 14(1), 3-35.

Kamat, M. S., and Kamat, M. M. (2012). An Examination of Carbon Disclosure Practices in India. http://dx.doi.org/10.2139/ssrn.2063844

Kolk, A., Levy, D. and Pinkse, J. (2008). Corporate Responses in an Emerging Climate Regime: The Institutionalization and Commensuration of Carbon Disclosure. *European Accounting Review*, 17(4), 719-745.

Kumar, P., and Firoz, M. (2018). Corporate Carbon Intensity Matter: Predicting Firms' Financial Performance. *SCMS Journal of Indian Management*, *15*(4), 1401-1417

Kumar, P., and Firoz, M. (2018). Impact of carbon emissions on cost of debt-evidence from India. *Managerial Finance*, *44*(12), 1401-1417.

Kumar, P., and Firoz, M. (2020). Accounting for Certified Emission Reductions (CERs) in India: An analysis of the disclosure and reporting practices within the financial statements. *Meditari Accountancy Research*, *28*(2), 365-389.

Kumari, P., and Patel, S. (2020). Quantifying the association between carbon footprints an d financial performance of Indian firms. *Pac. Bus. Rev. Int.*, *13*, 15.

Kurnia, P., Darlis, E., and Putra, A. A. (2020). Carbon emission disclosure, good corporate governance, financial performance, and firm value. *The Journal of Asian Finance, Economics and Business (JAFEB)*, *7*(12), 223-231.

Laskar, N., Kulshrestha, N., Bahuguna, P. C., and Adichwal, N. K. (2022). Carbon emission intensity and firm performance: An empirical investigation in Indian context. *Journal of Statistics and Management Systems*, *25*(5), 1073-1081.

Lee, C. M. (2014). Performance Measurement: An Investor's Perspective. *Accounting and Business Research*, 44(4), 383-406.

Lee, K. H., Min, B., and Yook, K. H. (2015). The Impacts of Carbon (CO_2) Emissions and Environmental Research and Development (R&D) Investment on Firm Performance. *International Journal of Production Economics*, 167, 1-11.

Leggett, J. A. (2020). The United Nations framework convention on climate change, the Kyoto protocol, and the Paris agreement: a summary. *UNFCC, New York*, *2*.

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

Li, Y., Eddie, I., and Liu, J. (2014). Carbon emissions and the cost of capital: Australian evidence. *Review of Accounting and Finance*, *13*(4), 400-420.

Linnenluecke, M. K., Griffiths, A. and Winn, M. I. (2013). Firm and Industry Adaptation to Climate Change: A Review of Climate Adaptation Studies in the Business and Management Field. *Wiley Interdisciplinary Reviews: Climate Change*, 4(5), 397-416.

Magness, V. (2006). Strategic Posture, Financial Performance and Environmental Disclosure: An Empirical Test of Legitimacy theory. *Accounting, Auditing & Accountability Journal*, 19(4), 540-563.

Maji, S. G., and Kalita, N. (2022). Climate change financial disclosure and firm performance: empirical evidence from Indian energy sector based on TCFD recommendations. *Society and Business Review*, *17*(4), 594-612.

Makan, L. T., and Kabra, K. C. (2021). Carbon emission reduction and financial performance in an emerging market: empirical study of Indian firms. *Indonesian Journal of Sustainability Accounting and Management*, *5*(1), 23-32.

Mardini, G. H., and Elleuch Lahyani, F. (2022). Impact of foreign directors on carbon emissions performance and disclosure: empirical evidence from France. *Sustainability Accounting, Management and Policy*

Journal, *13*(1), 221-246.

Matisoff, D. C., Noonan, D. S., and O'Brien, J. J. (2013). Convergence in Environmental Reporting: Assessing the Carbon Disclosure Project. *Business Strategy and the Environment*, 22(5), 285-305.

Matsumura, E. M., Prakash, R., and Vera-Munoz, S. C. (2011, August). Carbon emissions and firm value. AAA.

Mia, P., Rana, T. and Ferdous, L. T. (2021). Government Reform, Regulatory Change and Carbon Disclosure: Evidence from Australia. *Sustainability*, 13(23), https://doi.org/10.3390/su132 313282.

Miah, M. D., Hasan, R., and Usman, M. (2021). Carbon emissions and firm performance: evidence from financial and non-financial firms from selected emerging economies. *Sustainability*, *13*(23), 13281.

Michelon, G. (2011). Sustainability Disclosure and Reputation: A Comparative Study. *Corporate Reputation Review*, 14, 79-96.

Momin, M. A., Northcott, D., and Hossain, M. (2017). Greenhouse gas disclosures by Chinese power companies: trends, content and strategies. *Journal of Accounting and Organizational Change*, *13*(3), 331–358.

Ngwakwe, C. C., and Msweli, P. (2013). On carbon emission reduction and firm performance: example from 3M Company. *Environmental economics*, 4(2), 54-61.

Nishitani, K., and Kokubu, K. (2012). Why does the reduction of greenhouse gas emissions enhance firm value? The case of Japanese manufacturing firms. *Business Strategy and the Environment*, *21*(8), 517-529.

Oestreich, A. M., and Tsiakas, I. (2023). Carbon Emissions and Firm Profitability. http:// dx.doi. org/10.2139/ssrn.4353433

Okereke C. 2007. An exploration of motivations, drivers and barriers to carbon management: the UK FTSE 100. European Management Journal 25(6): 475–486.

Okereke, C. and Russel, D. (2010). Regulatory Pressure and Competitive Dynamics: Carbon Management Strategies of UK Energy-Intensive Companies. *California Management Review*, *52*(4), 100-124.

Pitrakkos, P., and Maroun, W. (2020). Evaluating the Quality of Carbon Disclosures. *Sustainability Accounting, Management and Policy Journal*, 11(3), 553-589.

Raihan, A., and Tuspekova, A. (2022). Dynamic Impacts of Economic Growth, Energy Use, Urbanization, Tourism, Agricultural Value-Added, and Forested Area on Carbon Dioxide Emissions in Brazil. *Journal of Environmental Studies and Sciences*, *12*(4), 794-814.

Ricca, B., Ferrara, M., and Loprevite, S. (2023). Searching for an Effective Accounting-Based Score of Firm Performance: A Comparative Study between Different Synthesis Techniques. *Quality & Quantity*, 57(4), 3575-3602.

Rosa, E. A., and Dietz, T. (2012). Human drivers of national greenhouse-gas emissions. *Nature Climate Change*, *2*(8), 581-586.

Sahu, A. K. (2022). Referent Object, Securitising Actors and the Audience: The Climate Change Threat and the Securitisation of Development in India. *Cambridge Review of International Affairs*, 35(1), 31-54.

Saka, C., and Oshika, T. (2014). Disclosure effects, carbon emissions and corporate value. S*ustainability Accounting, Management and Policy Journal*, *5*(1), 22–45.

Salvia, M., F. Pietra, C. Cosmi, V. Cuomo and M. Machiato (2004) Approaching the Kyoto Targets: A Case Study for Basilicata Region. Renewable and Sustainable Energy Review, 8, 73–90

Saputra, F. (2022). Analysis Effect Return on Assets (ROA), Return on Equity (ROE) and Price Earning Ratio (PER) on Stock Prices of Coal Companies in the Indonesia Stock Exchange (IDX) Period 2018-2021. *Dinasti International Journal of Economics, Finance & Accounting*, 3(1), 82-94.

Sharma, J., and Verma, S. (2021). Corporate Environmental Performance and Firm Value-Using Emission Metrics: An Empirical Study in India. *The Journal of Asian Finance, Economics and Business*, *8*(6), 975-981.

Shi, Y. (2016). Reducing Greenhouse Gas Emissions from International Shipping: Is It Time to Consider Market-Based Measures?. *Marine Policy*, 64, 123-134.

Sprengel, D. C., and Busch, T. (2011). Stakeholder Engagement and Environmental Strategy–The Case of Climate Change. *Business Strategy and the Environment*, 20(6), 351-364.

Sudibyo, Y. A. (2018). Carbon emission disclosure: does it matter. In *IOP Conference Series: Earth and Environmental Science* (Vol. 106, No. 1, p. 012036). IOP Publishing.

Tompkins, E. L. and Amundsen, H. (2008). Perceptions of the Effectiveness of the United Nations Framework Convention on Climate Change in Advancing National Action on Climate Change. *Environmental Science & Policy*, 11(1), 1-13.

Torraco, R.J., (2005). Writing integrative literature reviews: guidelines and examples. *Human Resouce Devlopment Review*, 4, 356-367.

Toukabri, M., and Jilani, F. (2022). The power of critical mass to make a difference: how gender diversity in board effect US corporate carbon performance. *Society and Business Review*.

Trinks, A.,and Hille, E. (2023). *Carbon costs and industrial firm performance: Evidence from international microdata* (No. 445). CPB Netherlands Bureau for Economic Policy Analysis.

Tuesta, Y. N., Soler, C. C. and Feliu, V. R. (2022). Bibliometric and Systemic Analysis of the Relationship between Management and Carbon. *Cuadernos de Gestion*, 22(1), 215-228.

Velte, P., Stawinoga, M., and Lueg, R. (2020). Carbon performance and disclosure: A systematic review of governance-related determinants and financial consequences. *Journal of Cleaner Production*, *254*, 120063.

Webster, J., and Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS quarterly*, 26(2), 13-23.

Weinhofer G, Hoffmann V. 2010. Mitigating climate change – how do corporate strategies differ? Business Strategy and the Environment 19: 77–89.

Zhang, Z. (2000). Decoupling China's carbon emissions increase from economic growth: An economic analysis and policy implications. *World development*, *28*(4), 739-752.

Zheng, S., and Jin, S. (2023). Can Companies Reduce Carbon Emission Intensity to Enhance Sustainability?. *Systems*, *11*(5), 249.