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Original Article

Financial and non-financial determinants of companies performance in the Brazilian Stock Exchange's Corporate Sustainability Index

Determinantes financeiros e não financeiros de desempenho das empresas no Índice De Sustentabilidade Empresarial da Bolsa De Valores Brasileira

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Abstract

Purpose – The present study aimed to identify financial and non-financial determinants of organizational sustainable performance in the context of companies listed on the Corporate Sustainability Index (ISE).
Design/methodology/approach – The study has a descriptive nature, a quantitative approach, a documentary data source, and, as a technique for data analysis, a binary logistic regression model was used.
Findings – The results showed that the regression model was statistically significant, with statistical significance of the financial indicators Return on Assets (ROA) and Net Profit Margin (NPM) and pollution levels in predicting sustainable performance. While higher levels of ROA showed a negative association, higher NPM values revealed a positive explanatory capacity in sustainable performance. It was also possible to observe that the polluting potential of economic activities was a predictor with the greatest impact on the ISE score, indicating that companies that carry out activities characterized as having a high polluting potential present superior sustainable performance.
Research limitations/implications - As a potential limitation in this study, it is worth highlighting the absence of other data, referring to other independent variables, especially those of a non-financial nature.
Practical implications (if applicable) - The study provided an impact assessment of financial and non-financial practices on the sustainable performance obtained in the ISE, with the purpose of providing insights for investors, managers, and other stakeholders interested in promoting practices and improving sustainable performance in the Brazilian financial market.

Originality/value (mandatory) – By integrating financial and non-financial variables, the study reveals the potential to promote the state of the art of analyses that aim to understand the influence of different factors on organizational sustainable performance.

Keywords: Financial determinants; Non-financial determinants; Sustainable performance; Corporate sustainability index; Capital markets

RESUMO

Objetivo – O presente estudo teve como objetivo identificar determinantes financeiros e não-financeiros do desempenho sustentável organizacional no contexto das empresas listadas no Índice de Sustentabilidade Empresarial (ISE).
Método – O estudo possui natureza descritiva, abordagem quantitativa, fonte de dados documental e, enquanto técnica para análise dos dados, foi empregado um modelo de regressão logística binária.
Resultados – Os resultados evidenciaram que o modelo de regressão foi estatisticamente significativo, havendo significância estatística dos indicadores financeiros Retorno sobre Ativos (ROA) e Margem de Lucro Líquido (MLL) e dos níveis de poluição na predição do desempenho sustentável. Enquanto níveis mais elevados de ROA apresentaram associação negativa, valores superiores de MLL revelaram capacidade explicativa positiva no desempenho sustentável. Também foi possível observar que o potencial poluidor das atividades econômicas se constituiu em um preditor com maior impacto para a pontuação no ISE, indicando que as empresas que exercem atividades caracterizadas como de alto potencial poluidor apresentam um desempenho sustentável superior.
Limitações – Enquanto potencial lacuna deste estudo, destaca-se a ausência de outros dados, referentes a outras variáveis independentes, especialmente as de caráter não financeiro.
Contribuições práticas – O estudo fornece uma avaliação de impacto das práticas financeiras e não-financeiras no desempenho sustentável obtido no ISE, capaz de fornecer *insights* para investidores, gestores e demais *stakeholders* que possuam interesse na promoção de práticas e na melhoria do desempenho sustentável no mercado financeiro brasileiro.
Originalidade – Ao integrar variáveis financeiras e não-financeiras, o estudo revela potencial de fomentar o estado da arte de análises que visam a compreender a influência de fatores distintos no desempenho sustentável organizacional.

Palavras-chave: Determinantes financeiros; Determinantes não financeiros; Desempenho sustentável; Índice de sustentabilidade empresarial; Mercado de capitais

1 INTRODUCTION

Several studies have focused on identifying the key determinants of strong sustainable performance in different economic, organizational, and sectoral contexts (Aksu & Akman, 2023; Nguyen, 2019; Shoaib et al., 2022; Wu et al., 2024; Yadegaridehkordi et al., 2023). The growing concern with sustainable performance and its increasing

prominence in the capital markets is the result of the integration of sustainability into the corporate environment, as evidenced by the relationship identified between sustainable performance and capital market performance (Peyerl; Paes; Jost, 2022).

Pressures exerted by stakeholders serve as a motivating factor in organizations' pursuit of sustainable alignment (Ali et al., 2019). Given the emphasis on the relationship between environmental and business performance, new sustainability indices are being developed. Moreover, the scope and prominence of these indices are increasing as a means of disclosure, aimed at providing stakeholders with transparency in the evaluation of sustainable practices adopted by organizations (Garcia, 2022).

There is empirical evidence highlighting the importance of sustainability indices in emerging economies, as these economies are more vulnerable to the damages caused by climate change and often face water scarcity, desertification problems, and other issues, which are exacerbated by political, institutional, and economic factors. This makes the strategic orientation toward Sustainable Development (SD) an imperative necessity for these nations (Jain & Mohaprata, 2023). While developed economies demonstrate superior sustainable performance, improvement in this area remains a challenge for emerging economies, which tend to have lower sustainable performance compared to developed countries (Koilo, 2020).

In light of the above, the present study aims to identify financial and non-financial determinants of organizational sustainable performance in the context of companies listed on the Brazilian Stock Exchange's Corporate Sustainability Index (ISE), the country's main sustainability index. To achieve this objective, a multivariate data analysis is proposed, using a logistic regression model composed of financial and non-financial predictors, aiming to evaluate the sustainable performance of companies linked to the ISE. By integrating financial and non-financial variables, the study reveals potential to advance the state of the art in analyses that seek to understand the influence of various factors on organizational sustainable performance.

Furthermore, the study aims to provide an impact assessment of financial and non-financial practices on sustainable performance as reflected in the ISE, with the goal of offering insights to investors, managers, and other stakeholders interested in promoting practices and improving sustainable performance in the Brazilian financial market. Additionally, by integrating variables of different natures, the study may contribute to the development of a more holistic view of sustainable performance in Brazil's capital market, with an emphasis on integrated approaches to corporate management.

2 FINANCIAL DETERMINANTS OF SUSTAINABLE PERFORMANCE IN THE ORGANIZATIONAL CONTEXT

The Brundtland Report defined Sustainable Development (SD) as the ability to meet the needs of the present without compromising the availability of resources for future generations (WCED, 1987). Notably, the last two decades have seen a rising organizational interest in the development of sustainability as a means of ensuring business performance. In contrast to this growth, the academic literature still lacks a more substantial body of studies that integrate the themes of "sustainability" and "performance" in a cohesive manner (Ji et al., 2021).

In recent Brazilian studies, various factors have demonstrated the ability to influence the sustainable performance of organizations, among which financial performance and its multiple measurement metrics stand out. Financial indicators are commonly used as dependent variables in analyses that associate them with sustainable performance, with particular emphasis on profitability indicators such as Return on Assets (ROA) and Return on Equity (ROE) (Castilho & Barakat, 2022; Duque-Grisales & Caracuel, 2021), as well as profitability measures such as Gross Profit Margin (GPM), Net Profit Margin (NPM), and MEBITDAMargin (Lucato, Costa & Oliveira Neto, 2017; Rodríguez-García et al., 2022).

In line with the trend in national studies that have sought to link financial performance to sustainable performance, a strong body of international research has also explored this

relationship. The dichotomy in views regarding the nature of the relationship between sustainable and financial performance is a hallmark of this research, with no consensus on whether the relationship is positive or negative (Baah et al., 2021; Feng et al., 2018; Indriastuti & Chariri, 2021; Lungu, Dascalu & Caraiani, 2019; Xie et al., 2019).

Among the findings that revealed a negative relationship, Baah et al. (2021) can be highlighted. The authors sought to analyze, among other issues, the impact of stakeholder pressures and "green production" on the financial performance of small and medium-sized enterprises. Based on the assumptions of three different theories Institutional Theory, Stakeholder Theory, and the Natural Resource-Based View the analysis showed a statistically significant and negative relationship between these constructs and financial performance, indicating that stakeholder pressures and green production have the potential to reduce the financial performance of these organizations.

In contrast, Feng et al. (2018) demonstrated results that positively associate supply chain performance with environmental performance, a pillar of sustainable performance, with positive reflections on financial performance. Additionally, Indriastuti and Chariri (2021) identified a positive association between Corporate Social Responsibility (CSR) and green investments with both sustainable and financial performance. However, the authors found an insignificant effect of financial performance on sustainable performance.

A possible explanation for the divergence between these and other studies regarding the relationship between the constructs lies in the existence of different streams of research and management theories that view environmental aspects either as financial expenditures or, in other cases, as investments capable of generating profit for organizations (Wieczorek-Kosmala, Marquardt, & Kurpanik, 2021). One prominent theory is Stakeholder Theory, which is commonly used in analyses that investigate the impact of sustainable performance on business performance, incorporating financial performance as a fundamental aspect of business performance in part of these analyses. The pressures exerted by stakeholders serve as a driving force for

companies to place greater emphasis on the sustainability agenda (Ali et al., 2019; Baah et al., 2021; Guo et al., 2023; Jabbour et al., 2020).

Stakeholder Theory highlights that aligning organizational strategies with stakeholder interests improves financial performance. Recent studies have identified a positive relationship between environmental strategies, Corporate Social Responsibility (CSR), and financial performance when aligned with stakeholder interests, considering customer loyalty, employee motivation, and supplier relationships, all contributing to the long-term profitability of companies (Glambosky, Jory & Ngo, 2023; Liao et al., 2024).

A good relationship with stakeholders has the potential to significantly improve organizational sustainable performance, encompassing the three fundamental pillars environmental, social, and economic by considering communication with various agents, employee training in sustainability-oriented sectors, relationship management, and internal controls (Wanzallah & Muathe, 2024).

This study follows a theoretical-empirical design similar to the aforementioned research that identified a positive relationship between sustainable performance and financial performance. However, this study adopts an opposite approach by positioning financial performance as a predictor of sustainable performance. Based on the above, the first two guiding hypotheses of this research are defined.

H_1: Financial performance has explanatory power over sustainable performance.

H_{1a}: Financial performance is a positively related predictor of sustainable performance.

The motivation for formulating a hypothesis that associates better financial performance as a predictor of superior sustainable performance stems from the recognition of the need for investments in innovation as a fundamental criterion (Rosa & Lace, 2018). Such investments require significant financial resources for research aimed at developing modern services and products focused on improving organizational sustainability. Thus, following this logic, better financial performance can provide organizations with greater availability for investments in sustainable initiatives.

Moreover, empirical evidence shows that larger companies, with presumably greater financial capacity, are more willing to play a strategic role in addressing social and environmental issues (Celik, 2023). Higher levels of financial performance have also been positively associated with increased corporate sustainability disclosure, positioning financial performance as a potential moderator of sustainable performance (Bello et al., 2022). Such evidence reinforces the need to investigate this relatively unexplored relationship, with financial performance configured as a positively related predictor of sustainable performance.

3 NON-FINANCIAL DETERMINANTS OF SUSTAINABLE PERFORMANCE IN THE ORGANIZATIONAL CONTEXT

Business success largely depends on an organization's ability to meet stakeholders' informational needs, thereby reducing their risk aversion in their relationship with the company. Additionally, it is observed that sustainable performance, which is analyzed by various stakeholders, goes beyond financial-accounting information. In general, the current major challenge for organizations lies in reporting non-financial information, which has proven capable of affecting sustainable performance and, consequently, the decision-making process of investors, suppliers, financial agents, governments, and society. The ISE incorporates six dimensions of sustainable performance in its comprehensive analysis, including human and social capital, corporate governance levels, innovation, environmental issues, and, with emphasis on the environmental pillar, the climate change dimension (Bastos et al., 2024; Belenesi, Bogdan & Popa, 2021).

Given this, beyond financial performance, this analysis seeks to incorporate non-financial variables into the sustainable performance prediction model. The integration of financial and non-financial factors for predicting sustainable performance is a common practice in recent studies. As observed in the study by Vaio and Varriale (2020), the authors integrated, through a qualitative analysis, the disclosure of financial and non-financial information as a means of verifying the practices adopted by the airport sector

in support of SD. Following the findings of studies that integrated financial and non-financial variables into their analysis, Houck et al. (2012) investigated the impact of the Balanced Scorecard on sustainable performance, with the premise that it constitutes a performance prediction matrix designed for financial and non-financial metrics.

There is a substantial range of non-financial aspects that have been shown to influence sustainable performance. For example, in the analysis of the social pillar of sustainability, female participation in leadership positions has been demonstrated to positively influence sustainable performance (Zhu et al., 2022). Additionally, innovation levels are a significant factor for business sustainable performance (Rosa & Lace, 2018). Notably, among the non-financial factors that directly and strongly affect sustainable performance are levels of air pollution (Mehmood et al., 2023).

The emphasis on air pollution levels as one of the main issues regarding organizational sustainable performance arises from the global movement toward mitigating greenhouse gas (GHG) emissions, the drivers of global warming. Given the increasing demands for environmental sustainability, managers are being compelled to recognize the impacts of economic activities on the environment, particularly regarding GHG emissions (Gregory, 2022). The climate agenda presents systemic risks for the global corporate environment, governments, and societies, prompting these agents to adopt urgent measures to mitigate and adapt to climate impacts (Chen, Kuo & Chen, 2022).

Companies play a crucial role in the global effort to combat GHG emissions, as the business sector is largely responsible, both directly and indirectly, for most of the climate issues resulting from pollution and the consequent destruction of the ozone layer (Rothemberg & Levi, 2012). Although there is a clear need and some progress in the implementation of environmentally oriented management and production systems, most organizations still tend to plan sustainable production chains focusing on isolated aspects or poorly integrated solutions, resulting in limited effectiveness in significantly reducing GHG emissions and, consequently, combating the advance of climate change (Zarte; Pechmann; Nunes, 2022).

Despite the clear association between pollution levels and damage to sustainable performance, high pollution levels may lead companies to focus on improving sustainable performance in other areas, in a somewhat compensatory manner, for the socio-environmental harm caused by their activities (Tan, Tan & Chan, 2020). The disclosure of GHG emissions mitigation practices is one of these compensatory measures aimed at legitimizing the company in the eyes of stakeholders. Among this group of measures, measurement systems that include environmental indicators stand out. These indicators encompass a range of specific variables, such as water and energy consumption, disposal methods, and the total amount invested in practices to control and prevent emissions (Agustini & Giannetti, 2018; Morioka & Carvalho, 2017).

Given the above, it is conceivable that although high pollution levels negatively impact sustainable performance directly, they may motivate organizations to adopt better sustainable practices in a compensatory manner, considering the challenges in reducing GHG emissions, which are often inherent to the economic activities carried out. Therefore, this study will test three distinct hypotheses regarding the predictive nature of pollution levels on organizational sustainable performance.

H2: The polluting potential of economic activities has explanatory power over the sustainable performance of organizations.

H2a: Polluting potential is positively related to organizational sustainable performance.

H2b: Polluting potential is negatively related to organizational sustainable performance.

The last non-financial predictor variable selected and added to the regression model was the age of the listed organizations. The motivation stems from the association, already identified in the literature, of the company's age as a factor influencing the sustainable performance of organizations (Hung & Ong, 2012; Kamboj & Rana, 2023). Additionally, the operational age of enterprises is commonly associated as a moderating variable in models that aim to understand the impact of other variables on organizational

sustainable performance (Falcó et al., 2024). Therefore, based on the aforementioned, the final hypothesis of this study is defined.

H_3: The operational age of organizations has explanatory power over sustainable performance.

Based on the discussed literature, it is conceivable that the pursuit of integrating non-financial variables into the sustainable performance prediction model reflects a growing concern with the complexity of stakeholder demands and the challenges faced by modern organizations. Emphasis is placed on the importance of including aspects beyond purely financial ones, recognizing that sustainable performance is influenced by a variety of factors, including social, environmental, and temporal aspects.

The association between air pollution levels and the sustainable performance of organizations highlights the growing concern with GHG emissions and the impacts of economic activities on the environment. Companies are challenged to adopt sustainable practices not only as a means of social responsibility but also as a strategy for legitimization in the eyes of stakeholders. Additionally, the inclusion of the organization's operational age as a predictor variable in the regression model underscores the importance of considering not only current factors but also the trajectory and experience of companies over time. This reflects a more comprehensive approach to analyzing sustainable performance, recognizing the influence of historical and contextual factors.

4 METHODOLOGICAL PROCEDURES

This study, in terms of its objectives, is classified as descriptive (Gil, 2014), as it begins with the characterization of companies listed on the ISE and then infers the predictive capacity that the model's independent variables (financial performance, operational age, and polluting potential) have on the dependent variable (ISE performance). The analysis technique used was binary logistic regression, which

primarily functions to quantify the probability of an event occurring according to the predictors included in the regression model.

The binary nature refers to the outcome (dependent variable), which in this case was the overall performance on the ISE score in 2022. The binary categorization of the dependent variable was established by setting a cutoff score of 75 points on the index, where companies with values equal to or above the threshold were classified as having superior performance, and the others as having inferior performance. The ISE performance data was extracted from the ESG Workspace platform, linked to B3 S.A., which, since the update of the ISE questionnaire in 2021. has provided both overall and dimensional performance data for the index. The free R software was used for data processing and analysis (Schmuller, 2019).

The analysis considered 77 of the 83 companies listed in 2022. The inclusion criterion for the analysis was companies that, during the study period, presented Standardized Financial Statements with free access on the B3 S.A. platform. This included 92.77% of the component companies and covered all sectors of the ISE. Table 1 presents the list and number of companies by sector of activity.

Table 1 – Number of companies analyzed by sector of activity

Sector Nº	Sector of Activity	Nº of Listed Companies
1	Industrial Goods	07
2	Cyclical Consumption	14
3	Non-Cyclical Consumption	12
4	Financial	12
5	Basic Materials	07
6	Oil, Gas, and Biofuels	02
7	Health	06
8	Information Technology	01
9	Telecommunications	02
10	Public Utility	14
-	Total number of companies	77

Source: Research data (2024)

Thus, based on the predictors, the overall quality of the model was analyzed, as well as the specific impact of each independent variable included for prediction. The quality evaluation statistic used was the "-2LL" (Log-Likelihood Ratio). Additionally, the Nagelkerke R^2 measure was used as an additional indicator of the regression model's quality, due to its ability to explain, in percentage terms, how much the independent variables financial performance, polluting potential, and operational age improve the prediction compared to the null model. Box 1 presents the predictive variables used in the model.

Box 1 – Predictive variables of the logistic regression model

Category	Independent Variable	References in the Literature
Financial Performance	Return on Assets (ROA) Return on Equity (ROE) Return on Investment (ROI) Net Profit Margin (NPM) Gross Profit Margin (GPM) Earnings Before Interest, Taxes, Depreciation, and Amortization Margin (EBITDA)	(Castilho; Barakat, 2022; Duque-Grisales; Caracuel, 2021; Lucato; Costa; Oliveira Neto, 2017; Rodriguéz-Garcia *et al.*, 2022)
Environmental Aspects	Annex I of Normative Instruction 13. dated August 23. 2021. issued by the Brazilian Institute of the Environment and Renewable Natural Resource (IBAMA)	(Chen; Kuo; Chen, 2022; Gregory, 2022; Karlsson et al., 2021; Mehmood *et al.,* 2023; Tan; Tan; Chan, 2020; Zarte; Pechmann; Nunes, 2022)
General Aspects	Operational Age	(Falcó et al., 2024; Hung; Ong, 2012; Kamboj; Rana, 2023)

Source: Own elaboration (2024)

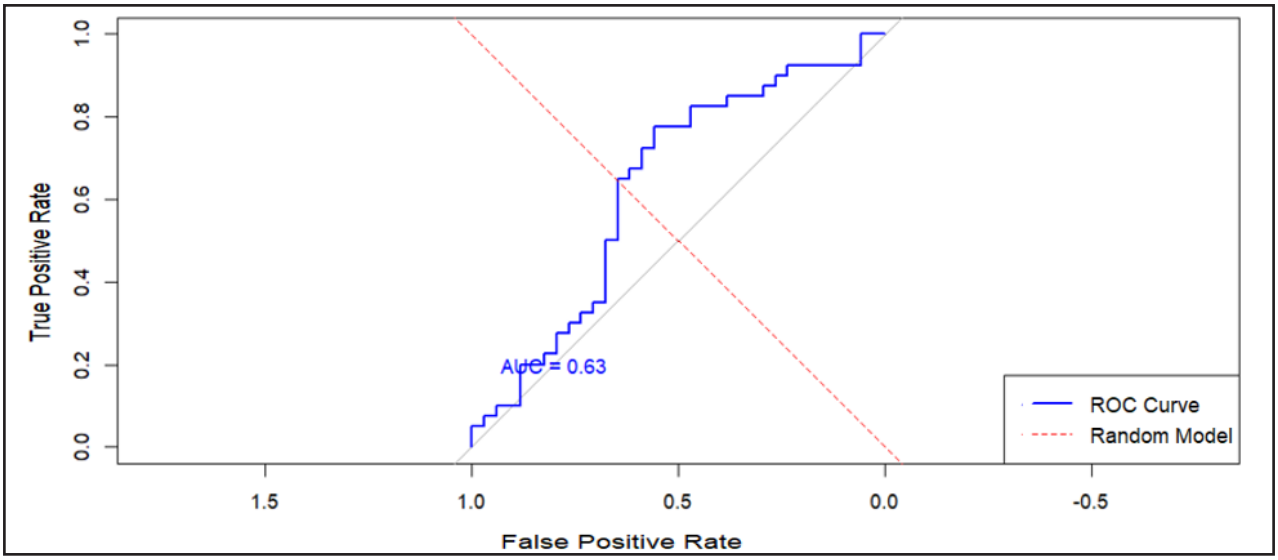
The predictive variables were grouped into general categories, with the category containing the largest number of variables being financial performance, with six indicators related to the profitability and profit margins of the listed companies. The information was obtained from the financial data available in the structured performance reports of these same companies, issued by the management of the organizations listed on B3. as part of the Standardized Financial Statements for the 2022 fiscal year.

The polluting potential variable, belonging to the environmental aspects category, was estimated through the categorization provided in Annex I of Normative Instruction 13. dated August 23. 2021. issued by the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) linked to the Ministry of the Environment. This instruction regulated the obligation of registration in the Federal Technical Registry of Potentially Polluting Activities and Users of Environmental Resources, listing these activities in Annex I (IN No. 13/2021). Meanwhile, the operational age of the companies was obtained by consulting their official websites and, in some cases, the National Registry of Legal Entities (CNPJ). Next, the analysis and discussion of the results will be addressed.

5 ANALYSIS AND DISCUSSION OF RESULTS

The binary logistic regression (enter method) aimed to test the hypotheses of this study and meet the objective of investigating to what extent sustainable performance can be predicted by other organizational factors (financial performance, environmental aspects, and operational age). The model was statistically significant [$\chi^2(8) = 16.101$. $p < 0.05$; Nagelkerke $R^2 = 0.261$], and was able to accurately predict 63.4% of the cases. Additionally, the Nagelkerke R^2 value indicated that the variables included in the model improved the prediction by approximately 26.1% compared to the null model, as shown in Graph 1.

Graph 1 – ROC Curve of the Logistic Regression Model



Source: Research data (2024)

The deviation of the ROC curve as the true positive rate increases suggests, as already indicated by the identified statistical significance, that the model is performing better than expected by random chance. This behavior is an indication that the logistic regression model has good discriminative ability between positive and negative classes. In other words, as the y-axis value increases, the true positive rate (sensitivity) is increasing more rapidly than the false positive rate (1 – specificity), which is a favorable sign for the model. Additionally, the positive direction of the ROC curve suggests that the model is making better predictions than the null model. Among the predictors analyzed, only the financial indicators ROA and NPM, and the environmental aspect of polluting potential, had a statistically significant impact on organizational sustainable performance. **Table 2** shows the results by predictor.

Tabela 2 – Resultado por variável preditora de desempenho do Índice de Sustentabilidade Empresarial (ISE)

	Wald	**Df**	**Sig.**	**Exp(B)**
ROA	4.006	1	0.045	0.765*
ROI	0.091	1	0.761	1.180
ROE	1.241	1	0.265	1.021
NPM	3.970	1	0.046	1.129*
GPM	0.378	1	0.538	0.196
MEBITDA	0.027	1	0.867	1.005
AGE	2.117	1	0.145	1.015
POLLUTING POTENTIAL	3.875	1	0.049	3.028*

Note: * = $p < 0.05$; ** = $p < 0.01$. df = degrees of freedom
Source: Research data (2024)

In the case of ROA (EXP (B = 0.765. p < 0.05)), it was found that a one-point increase in this financial profitability indicator decreases the chances by 0.765 times for companies to achieve superior sustainable performance in the ISE, i.e., above the 75-point cutoff established in this study's methodology. In contrast, the NPM (EXP (B = 1.129. p < 0.05)), a profitability indicator, showed that a one-point increase in the

margin value implies a 1.129 times higher chance of achieving superior sustainable performance. Thus, H1 was confirmed, indicating that financial performance is a significant predictor of sustainable performance for companies in the IS.

A possible explanation for the divergent influence of these financial indicators on sustainable performance lies in the nature of these variables. The fact that an increase in ROA leads to a reduced chance of superior sustainable performance may indicate that high profitability of these organizations' assets is not being used in a sustainable way. It could also suggest that the assets generating this profitability are associated with unsustainable practices or composition in one or more pillars.

Additionally, the sectoral context of the listed organizations should be considered, as the economic activity conducted can have varying positive or negative impacts on sustainable performance. For example, sectors that intensively use natural resources and have high ROA may have profitability linked to unsustainable practices. When analyzing the specific companies in this study, there is a strong representation of companies considered to have high polluting potential, as defined in Annex I of Normative Instruction 13. dated August 23. 2021. issued by the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), which was used to characterize the companies in this analysis. Among the activities conducted, it is worth highlighting electricity generation and transmission, chemical product manufacturing, metallurgy, textile production, and paper and pulp manufacturing, among others. Overall, 61.03% of the companies analyzed are classified by IBAMA as having high polluting potential.

Discussions on sustainable development, considering environmental, social, and economic issues, are strongly associated with the debate on the socio-environmental and socio-economic impacts of the electric power generation and supply sector (Xu & Liu, 2019). The energy sector represents a significant activity for global economies, including Brazil. However, the polluting potential of these activities raises concerns about the negative environmental and social impacts stemming from energy generation and transmission (Kasradze, Streimikiene & Tutliene, 2023). Among fossil fuels, such as coal, there is a

high level of atmospheric emissions from the industrial processes involved, prompting governments and societies to seek alternative energy generation and supply methods with lower environmental impacts (Grigashkina; Grigashkin; Miller, 2018; Qu et al., 2017).

The paper and pulp industry also faces challenges regarding the polluting potential of its activities, as it is a sector linked to deforestation and GHG emissions (Karlsson et al., 2021). This study could delve into the social, environmental, and economic impacts of all activities conducted by the companies under analysis that have high polluting potential. However, the theoretical review in this discussion of results, presented as an example, serves to demonstrate the potential association between higher profitability, resulting from the development of these activities, and a possible reduction in the sustainable performance of these organizations. This was identified in the predictive relationship between the ROA variable and sustainable performance during the quantitative data analysis.

Despite this, the positive association of NPM as a significant predictor of sustainable performance may indicate that part of these organizations' profits is being directed towards the adoption, implementation, or improvement of certain sustainability practices, such as investments in clean technologies (Li, 2023), innovation in service delivery, and product development (Rosa & Lace, 2018), among other initiatives.

In general, the fact that two distinct financial indicators have significant explanatory power, but with opposing directions of influence, may be related to specific strategic issues within each business. For example, a company that prioritizes short-term growth may focus on optimizing ROA, even if it means compromising long-term sustainability. Conversely, a company with a more sustainability-focused approach may be willing to sacrifice immediate profits in favor of more sustainable practices, resulting in a high NPM in the long term, with process improvements and subsequent reductions in resource consumption, or benefits to the company's image in the eyes of stakeholders.

Additionally, it is also important to consider the possibility that other variables not included in the model may be influencing the relationship between these financial metrics and sustainable performance. There may be complex interactions between

ROA, NPM, and other variables that were not considered in the initial analysis. In light of the above, H1a was partially confirmed, indicating a positive relationship between NPM as a predictor of sustainable performance and a negative relationship between ROA in predicting sustainable performance.

Concluding the significant results, statistical significance was observed in the association between companies' polluting potential and sustainable performance (EXP (B = 3.028. $p < 0.05$)), showing that a one-point increase in polluting potential is directly associated with a 3.028 times higher likelihood of achieving superior sustainable performance. Thus, this predictor had the greatest impact on the model, leading to the confirmation of hypotheses **H2** and **H2a** and the rejection of hypothesis **H2b**, as polluting potential proved to be a positively related predictor of sustainable performance for companies listed on the ISE.

This finding aligns with studies that associated companies' polluting potential with the need and efforts to achieve better sustainable performance and, consequently, legitimacy in the eyes of stakeholders (Agustini & Giannetti, 2018; Morioka & Carvalho, 2017; Tan, Tan & Chan, 2020). Furthermore, the prominence of polluting potential as a possible motivator of sustainable performance may be linked to the growing corporate concern with climate issues, especially considering companies that are already striving for this alignment, such as those listed on the ISE. Empirical evidence suggests that the necessary reduction in pollution levels from high-polluting activities cannot occur without significant financial support, which could be excessive for many organizations (Capece et al., 2017).

It is also noteworthy that these companies may face a range of risks associated with the pollution levels of their activities and the resulting effects of climate change due to GHG emissions, which may motivate them to pursue better sustainable performance. The risks related to global climate change are seen as threats to companies, considering their impact on financial performance, business operations, and stakeholders' perception of organizational responsibility in addressing climate issues (Gasbarro; Iraldo; Daddi; 2017; Kouloukoui et al., 2018).

Based on the aforementioned, the growing importance of the environmental agenda in corporate strategies is evident. The emphasis on polluting potential as a possible motivator of sustainable performance reflects the increasing business concern with climate issues, particularly among companies listed on the ISE, which already demonstrate alignment with this agenda. However, it is crucial to acknowledge the challenges these companies face in reducing pollution levels, especially considering the financial costs involved, which may be excessive for many organizations. Furthermore, the risks associated with climate change and GHG emissions highlight the urgent need for sustainability-focused actions, not only as a means of demonstrating social and environmental responsibility but also as a measure to protect companies' financial performance and reputation in the eyes of stakeholders and in response to global climate challenges.

Concluding the hypothesis tests, **H3** was not confirmed, as the operational age of organizations did not prove to be a significant predictor of performance in the ISE score. Despite this, the inclusion of this variable in the regression helped improve the model's quality, which may indicate an emerging contributory role of the age of these organizations when combined with the other predictive variables. Therefore, it was not possible to infer that older or newer companies have any advantage in terms of their sustainable performance.

The sustainable performance score used in this study was based on the score provided by the ISE in 2022. The index's methodology incorporates a large corpus of sustainability-related issues in performance measurement, such as employee quality of life, career plans, anti-corruption policies, social investments, innovation levels, and the appreciation of organizations' human and social capital. It also includes environmental management practices, ecological impacts, energy management, water management, liquid effluent management, hazardous waste management, as well as practices aimed at improving air quality in the environments where these organizations operate. It is understood that the use of ISE performance, as the dependent variable for sustainable performance, was appropriate since it is the most important and comprehensive sustainability index in Brazil, incorporating all dimensions of sustainability into its analysis criteria.

6 FINAL CONSIDERATIONS

This study aimed to identify financial and non-financial determinants of organizational sustainable performance in the context of companies listed on the ISE. The timeframe adopted for analysis was the year 2022. The logistic regression model used incorporated six financial indicators and two non-financial indicators in the prediction of sustainable performance. The financial indicators used were ROA, ROE, and ROI, related to profitability, and NPM, GPM, and EBITDA Margin, related to the profitability of the listed organizations. The non-financial indicators included in the logistic regression model were the polluting potential of these companies and their operational age.

The results demonstrated statistical significance of the logistic regression model in predicting sustainable performance [$c^2(8) = 16.101$. $p < 0.05$; *Nagelkerke* $R^2 = 0.261$], being able to accurately predict 63.4% of the cases. Additionally, the Nagelkerke R^2 value indicated that the variables included in the model improved the prediction by approximately 26.1% compared to the null model. The independent variable ROA was significant in predicting sustainable performance (EXP (B = 0.765. p < 0.05)), indicating a negative influence, reducing the chances of superior sustainable performance by 0.765 times for each one-point increase in this indicator.

Meanwhile, NPM ($B = 1.129$. $p < 0.05$) and polluting potentia (EXP ($B = 3.028$. $p < 0.05$) were significant and showed a positive impact on the sustainable performance of companies listed on the ISE, with the latter being the variable with the highest predictive capacity in the regression model. Thus, hypotheses H1. H2. and H2a were confirmed, hypothesis H1a was partially confirmed, and the remaining hypotheses of this study were rejected based on the data obtained from the analysis.

In conclusion, the study successfully achieved its objective by identifying significant financial and non-financial determinants of sustainable performance. The growing importance of the sustainability agenda in corporate strategies reflects not only a response to global concerns about socio-environmental responsibility but also an increasing

understanding of the financial and reputational benefits associated with sustainability. Sustainable alignment within the corporate sphere is not just a demonstration of social and environmental responsibility but also a crucial measure for protecting companies' survival in a world that is increasingly aware and demanding of business practices.

A potential limitation of this study is the absence of other data related to additional independent variables, particularly non-financial ones, which could have enhanced the model's predictive capacity and, consequently, aided in the analysis and generation of new insights. As a suggestion for future research, there is potential for developing studies that incorporate a larger body of non-financial variables, with the possibility of using primary data, to better understand the aspects that influence the sustainable performance of publicly traded companies.

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APPENDIX I – DISAGGREGATED RESEARCH DATA

COMPANY	IBAMA SEGMENT	POLLUTING POTENTIAL	B3 SECTOR
A	Non-Metallic Mineral Products Industry/ Manufacturing and processing of non-metallic mineral products such as ceramic materials, cement, gypsum, asbestos, glass, and similar products	1	BI
B	Electricity Transmission	1	UP
C	Food and Beverage Industry/Manufacturing of Alcoholic Beverages - Manufacturing of Non-Alcoholic Beverages	1	CNC
D	Utility Services/Treatment and disposal of industrial liquid and solid waste	1	UP
E	Textile, Clothing, Footwear, and Fabric Goods Industry/Manufacturing of Footwear and Footwear Components	1	CC
F	-	0	BI
G	-	0	F
H	-	0	F
I	-	0	F
J	-	0	F
K	-	0	F
L	-	0	F

Continua...

APPENDIX I – DISAGGREGATED RESEARCH DATA

COMPANY	IBAMA SEGMENT	POLLUTING POTENTIAL	B3 SECTOR
M	Chemical Industry/Manufacturing of products derived from the processing of petroleum, bituminous rocks, and wood	1	MB
N	Food and Beverage Industry/Slaughterhouses, meatpacking plants, cold storage facilities, and animal-derived products	1	CNC
O	Food and Beverage Industry/Manufacturing and refining of sugar	1	CNC
P	-	0	BI
Q	Electricity Transmission	1	UP
R	Food and Beverage Industry/Manufacturing and refining of sugar	1	CNC
S	Electricity Transmission	1	UP
T	Electricity Transmission	1	UP
U	Utility Services/Disposal of sanitary sewage and urban solid waste, including those from septic tanks	1	UP
V	Utility Services/Disposal of sanitary sewage and urban solid waste, including those from septic tanks	1	UP
W	-	0	F
X	-	0	CC
Y	Metallurgical Industry/Production of laminated products, alloys, non-ferrous metal artifacts with or without surface treatment, including electroplating	1	MB
Z	Wind energy generation and other alternative energy sources	1	PGB
A2	Electricity Transmission	1	UP
B2	Electricity Transmission	1	UP
C2	Non-Metallic Mineral Products Industry/ Manufacturing and processing of non-metallic mineral products such as ceramic materials, cement, gypsum, asbestos, glass, and similar products	1	MB
D2	-	0	S

Continua...

APPENDIX I – DISAGGREGATED RESEARCH DATA

COMPANY	IBAMA SEGMENT	POLLUTING POTENTIAL	B3 SECTOR
E2	-	0	BI
F2	Electricity Transmission	1	UP
G2	Utility Services/Thermoelectric power generation	1	UP
H2	Electricity Transmission	1	UP
I2	-	0	CC
J2	-	0	S
K2	-	0	CC
L2	Textile, Clothing, Footwear, and Fabric Goods Industry/Manufacturing of footwear and footwear components	1	CC
M2	Textile, Clothing, Footwear, and Fabric Goods Industry/Manufacturing and finishing of yarns and fabrics	1	CC
N2	Textile, Clothing, Footwear, and Fabric Goods Industry/Manufacturing and finishing of yarns and fabrics	1	CC
O2	Chemical Industry/Manufacturing of pharmaceutical and veterinary products	1	S
P2	-	0	F
Q2	Transportation Equipment Industry/Manufacturing and assembly of road and rail vehicles, parts, and accessories	1	CC
R2	Paper and Pulp Industry/Manufacturing of paper, cardboard, poster board, fiberboard, and pressed fiber artifacts	1	MB
S2	-	0	F
T2	-	0	F
U2	Food and Beverage Industry/Slaughterhouses, meatpacking plants, cold storage facilities, and animal-derived products	1	CNC
V2	Paper and Pulp Industry/Manufacturing of paper, cardboard, poster board, fiberboard, and pressed fiber artifacts	1	MB
W2	Electricity Transmission	1	UP
X2	-	0	TI

Continua...

APPENDIX I – DISAGGREGATED RESEARCH DATA

COMPANY	IBAMA SEGMENT	POLLUTING POTENTIAL	B3 SECTOR
Y2	-	0	CC
Z2	-	0	CC
A3	Food and Beverage Industry/Manufacturing and refining of sugar	1	CNC
B3	-	0	CC
C3	Food and Beverage Industry/Slaughterhouses, meatpacking plants, cold storage facilities, and animal-derived products	1	CNC
D3	Food and Beverage Industry/Slaughterhouses, meatpacking plants, cold storage facilities, and animal-derived products	1	CNC
E3	-	0	CC
F3	-	0	CC
G3	Chemical Industry/Manufacturing of perfumes and cosmetics	1	CNC
H3	Electricity Transmission	1	UP
I3	-	0	S
J3	-	0	S
K3	-	0	S
L3	Transport, Terminals, Warehouses, and Trade/ Transport of hazardous cargo	1	BI
M3	Transport, Terminals, Warehouses, and Trade/ Marinas, ports, and airports	1	BI
N3	-	0	CNC
O3	Transport, Terminals, Warehouses, and Trade/ Transport of hazardous cargo	1	F
P3	-	0	CNC
Q3	Paper and Pulp Industry/Manufacturing of paper, cardboard, poster board, fiberboard, and pressed fiber artifacts	1	MB
R3	-	0	F
S3	Electronics and Communications/Manufacturing of electrical, electronic materials, and telecommunication and computer equipment	1	TC

Continua...

APPENDIX I – DISAGGREGATED RESEARCH DATA

Conclusão

COMPANY	IBAMA SEGMENT	POLLUTING POTENTIAL	B3 SECTOR
T3	Electronics and Communications/Manufacturing of electrical, electronic materials, and telecommunication and computer equipment	1	TC
U3	-	0	CNC
V3	Metallurgical Industry/Steel manufacturing and steel products	1	MB
W3	-	0	CC
X3	Electricity Transmission	1	PGB
Y3	Electronics and Communications/Manufacturing of electrical, electronic materials, and telecommunication and computer equipment	1	BI

Legends: BI (Industrial Goods), CC (Cyclical Consumption), CNC (Non-Cyclical Consumption), F (Financial), MB (Basic Materials), PGB (Oil, Gas, and Biofuels), S (Health), TC (Telecommunications), TI (Information Technology), UP (Public Utility).

COMPANY	ROA	ROE	ROI	NPM
A	-2.455895524	-10.47715591	0.135430214	-3.755097445
B	1.690996504	5.743788568	0.467196566	11.25274467
C	10.79406924	17.87073003	0.971913585	18.68211033
D	1.100333697	8.36789658	0.285015553	2.869419448
E	9.068771377	15.9172423	1.17103911	9.980286868
F	-3.858531566	3.800431409	0.211678271	-4.529495644
G	8.880382726	20.83798354	8.922462803	41.80329279
H	1.178984841	13.36589836	0.568131198	10.30394767
I	1.486722073	18.30381506	0.458356526	12.61866614
J	2.121776943	18.50722204	0.209727845	15.80084358
K	1.201372976	9.380604661	1.109577949	5.656320407
L	1.455118264	12.95577539	0.701444411	12.44474751
M	-0.931745191	-13.43094065	0.13338026	-0.84997626
N	-5.430223886	-26.57245039	0.178065008	-5.838907843

Continua...

COMPANY	ROA	ROE	ROI	NPM
O	3.838599609	11.79173854	0.131948994	3.465625554
P	8.333145391	35.62775158	1.402034436	21.95937783
Q	1.346464426	3.276976221	1.148762203	10.67781041
R	-0.009124296	-0.029126921	0.330440126	-0.023093355
S	7.628662471	18.79592803	0.246303678	11.880538
T	2.312344956	5.438970055	0.295320995	5.241406528
U	6.394140477	11.62534113	0.599666592	13.65358261
V	6.913156332	13.10518731	1.380529548	20.29625742
W	1.561855301	12.41013458	0.705778533	16.03537831
X	-2.049487075	-4.085659298	1.730574519	-10.6240483
Y	7.798525504	17.98159361	0.229850607	10.84743865
Z	2.097538884	5.856155689	0.292140311	7.09879678
A2	7.33534852	29.75387493	0.430140385	13.26112103
B2	7.194589305	64.61777372	1.510688889	42.56052119
C2	4.895560017	12.83089471	0.511461633	9.013238439
D2	-1.444506188	-5.469659699	0.407102254	-2.953531573
E2	1.292507461	9.292923277	0.465980741	3.861512879
F2	3.277534951	10.19461642	0.43419206	7.014988441
G2	0.900834922	2.73568366	0.441590401	6.131478903
H2	6.977728821	31.57006753	0.884728272	22.3789065
I2	6.182365385	7.53714961	0.521319999	30.51094305
J2	3.962270447	11.42988836	0.372006161	6.917504661
K2	-1.516255568	-4.69240896	0.15572523	-7.323258776
L2	11.78010004	13.01580704	0.669656467	22.60663617
M2	3.150843873	8.282118015	1.307825346	6.881975641
N2	0.341480806	0.987633116	1.391118502	0.614517921
O2	7.149457983	15.93926521	1.709807166	22.50621658
P2	0.159303948	0.31212205	1.414776993	1.261486056
Q2	2.659821637	9.415098326	0.119467262	2.384795398
R2	10.75885164	33.61612678	0.919733119	22.42352665

Continua...

COMPANY	ROA	ROE	ROI	NPM
S2	1.322909135	17.33194995	0.688728382	10.84687266
T2	14.64656395	18.49349971	0.512386384	166.7923639
U2	7.784923892	32.52680528	0.188595639	4.322044777
V2	9.855324459	40.53246182	0.904639297	23.40624696
W2	-23.53015334	-199.391477	0.175826181	-42.79846523
X2	0.640921712	1.016964408	0.823824377	2.659884244
Y2	-0.616983593	-3.484022637	0.498281555	-0.808719626
Z2	6.107667484	12.80497724	0.151019662	9.73318262
A3	4.21206641	7.182278112	0.398647665	4.75692811
B3	-1.321233511	-4.685782801	0.388639419	-1.337770378
C3	2.030042058	10.44618467	0.157268003	2.115087734
D3	3.06102842	61.65337249	0.227311291	2.114626137
E3	2.119732347	20.09641407	0.601477926	5.795878325
F3	-0.546264337	-1.877961909	0.247301149	-1.857903762
G3	-5.227403517	-12.7895954	1.763175257	-7.864252127
H3	5.185337637	17.77109552	0.411134197	11.18797766
I3	22.34623015	38.07289303	1.597365256	23.72559821
J3	5.906022273	18.78547258	0.434865548	3.491776693
K3	1.364804526	5.470029211	0.292470474	5.491332812
L3	1.118610403	3.335535302	0.469946295	5.222990217
M3	9.875415011	20.5195417	0.831047337	22.23009036
N3	3.003594466	31.31416838	0.196742542	2.237710932
O3	1.525647769	16.85325381	0.452107844	3.858235845
P3	8.990436018	27.30014427	0.484840466	13.93924321
Q3	17.56399692	70.53798932	1.00758905	46.94851067
R3	-0.808303745	-1.279445821	0.77718975	-6.941848139
S3	3.406524078	5.927765381	0.751302217	8.446719086
T3	2.96189216	6.578458041	1.02053673	7.75983671

Continua...

Conclusão

COMPANY	ROA	ROE	ROI	NPM
U3	9.391236979	20.26478107	0.178569424	8.294907854
V3	5.232163507	8.084476248	0.212000671	6.445507015
W3	4.009669084	18.37454189	0.741710448	13.60812577
X3	3.738749696	12.18584001	0.043050869	0.847083981
Y3	15.18721747	28.02185547	0.409985886	14.28828531

COMPANY	GPM	EBITDA MARGIN	UPTIME	OVERALL PERFORMANCE OF THE ISE
A	0.119276564	8.6458092	12	0
B	0.318428067	13.68053434	25	1
C	0.492878386	22.15418375	23	0
D	0.221799302	18.78414931	17	1
E	0.539391071	12.99396796	50	1
F	0.174698413	8.963813608	14	0
G	0.899218569	55.16812812	5	1
H	0.362298256	14.50764607	79	1
I	0.314296619	17.87190979	214	1
J	0.173367792	19.52116122	39	1
K	0.525971534	7.93424282	53	1
L	0.412264078	16.98824643	40	1
M	0.117683592	4.42613416	20	1
N	0.151150409	-0.253301606	13	1
O	0.116567968	6.719796251	59	0
P	0.583686235	61.40410144	24	1
Q	0.53461579	23.52644299	60	1
R	0.248369032	2.113041972	41	1
S	0.197627338	16.50236104	70	1

Continua...

COMPANY	GPM	EBITDA MARGIN	UPTIME	OVERALL PERFORMANCE OF THE ISE
T	0.227990588	13.29931186	68	1
U	0.374869735	20.27465433	59	0
V	0.579925399	31.52372715	59	0
W	0.413757425	25.10950513	27	0
X	0.633776704	5.956244469	56	0
Y	0.186893112	12.8321231	67	1
Z	0.226090238	19.7808949	86	1
A2	0.300767945	27.16576617	24	1
B2	0.601702941	64.0357247	23	1
C2	0.338388764	17.07650251	71	1
D2	0.289319595	7.743196627	61	0
E2	0.317862799	25.44628414	23	1
F2	0.302743316	19.7676608	26	1
G2	0.306321685	20.95020676	10	1
H2	0.469419536	48.71736318	6	1
I2	0.342676097	21.38183829	35	0
J2	0.271140299	16.46794562	96	1
K2	0.134742433	-8.755216783	68	0
L2	0.401074401	9.516623047	51	0
M2	0.566691647	9.173537938	74	0
N2	0.581785679	4.286043787	66	0
O2	0.630970051	32.90000272	21	0
P2	0.585883085	48.68149568	56	0
Q2	0.10671796	7.350092215	104	0
R2	0.479094261	34.37924284	81	1
S2	0.40783846	13.24513361	14	1
T2	0.338793307	183.4668866	56	1
U2	0.158670983	6.57225526	69	0

Continua...

Conclusão

COMPANY	GPM	EBITDA MARGIN	UPTIME	OVERALL PERFORMANCE OF THE ISE
V2	0.474966204	33.39836534	123	1
W2	0.149534161	-14.4146214	117	0
X2	0.451701593	4.265600171	24	0
Y2	0.332568704	3.785843882	55	0
Z2	0.131205111	10.6049768	57	1
A3	0.285023652	6.261281117	86	1
B3	0.279870652	5.188500754	65	1
C3	0.135895923	7.390973417	22	1
D3	0.185210788	7.822496836	30	0
E3	0.375576782	25.17438229	9	0
F3	0.198268998	5.453219839	43	0
G3	0.638097512	-1.259383075	53	1
H3	0.291350176	21.82672307	25	1
I3	0.614994465	30.39383481	35	0
J3	0.30307059	6.327794249	117	1
K3	0.226287935	16.96073809	45	0
L3	0.319703037	30.85067857	25	0
M3	0.453864474	31.20349967	25	0
N3	0.164398386	6.913059428	54	0
O3	0.311345914	20.98621877	66	0
P3	0.326526975	26.12480461	45	0
Q3	0.501890091	44.59634581	98	1
R3	0.437313883	30.1235619	15	0
S3	0.428996326	13.73387055	24	1
T3	0.505081999	14.67625844	24	1
U3	0.151513708	7.808068124	42	0
V3	0.174917949	8.21182359	66	0
W3	0.425851753	32.79129101	3	0
X3	0.041273988	2.183018639	5	0
Y3	0.290773042	16.89227206	61	0

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1. Definition of research problem	√	√		
2. Development of hypotheses or research questions (empirical studies)	√	√		
3. Development of theoretical propositions (theoretical work)			√	√
4. Theoretical foundation / Literature review	√	√	√	
5. Definition of methodological procedures	√		√	
6. Data collection	√			√
7. Statistical analysis	√	√		
8. Analysis and interpretation of data	√		√	
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10. Manuscript writing	√	√		
11. Other (please specify)				

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The authors have stated that there is no conflict of interest.

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