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## INDUSTRY AND PERFORMANCE IN THE PORTUGUESE LISTED COMPANIES: THE MEDIATING ROLE OF THE ENVIRONMENTAL INFORMATION DISCLOSURE\*

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**Abstract.** Based on the legitimacy and stakeholders' theories, this research aims to analyze the environmental information disclosure of Portuguese companies. Specifically, this study aims to explore the environmental information disclosure level, whether the industry (environmentally sensitive) influences the level of ecological matters disclosure, and whether this impacts the companies' performance/profitability. Using the content analysis technique, we developed two indices to assess the level of environmental disclosures in companies' mandatory and voluntary reporting. In addition, for the relationship between variables analysis, we applied the Process Macro of SPSS software. Study results show that (1) there is a positive evolution in the level of environmental disclosure by Lisbon stock exchange listed companies between the years 2015 and 2017, (2) the industry has no significant relationship with profitability; (3) the environmental disclosure acts as a mediator variable in the relationship between industry and profitability. This research presents differences in the tendency of environmental matters disclosure when prepared under an accounting framework or voluntarily and assesses the mediating role of the environmental disclosure index in the relationship between industry and performance.

**Keywords:** environmental accounting; environmental disclosure; performance; industry-listed companies; Portugal

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## **1. Introduction**

Environmental pollution is a primary global concern requiring worldwide action by citizens, businesses, and governments to lower the number of contaminants generated and mitigate their environmental impact. Thus, it is an issue that has been on economic decision-makers agenda for several decades. Indeed, the 1960s witnessed a remarkable growth in public awareness of environmental problems, resulting in several movements and initiatives for preserving the environment (Wilkinson and Mangalagiu, 2012). Therefore, many companies now publish sustainability reports to communicate the measures taken to protect the environment, i.e., reporting on their environmental performance.

The magnitude of the recent branch of accounting, environmental accounting, has been recognized worldwide (Zrnić, Starčević and Mijoč, 2020). Environmental accounting plays an essential role in environmental information disclosure. According to Yakhou and Dorweiler (2004), society's increasing attention towards the environment has made accounting take a leading role in measuring environmental performance. Businesses increasingly engage with stakeholders, including customers, employees, and local communities, to promote sustainability. The environmental reports allow companies to disclose their environmental performance and gain further support for their environmental initiatives.

Environmental accounting has been encouraged in companies. In the European Union (EU), environmental and social accounting has been regulated by directive 2014/95/EU, recently amended by directive 2022/2464/EU. In Portugal, Directive 2014/95/EU requires public interest companies with more than 500 employees to prepare a non-financial statement. Recently, directive 2022/2464/EU has extended the scope to all listed companies, except micro-entities, indicating in more detail the information to be disclosed by companies requires that auditors carry out limited assurance work in sustainability reporting. This EU regulation highlights the importance of disclosing information on environmental, social and corporate governance issues.

This study, based on legitimacy and stakeholder theories, has two objectives. The first is to analyze the environmental information disclosed by companies in the annual report and sustainability report to identify the disclosure level evolution between 2015 and 2017. We selected the period from 2015 to 2017 so that the European directive's introduction does not influence the results. Previous studies suggest that the industry affects environmental information disclosure (Monteiro, Pereira and Barbosa, 2021; Elshabasy, 2018; Clarkson, Overell and Chapple, 2011), improving the business performance. In this context, the second study objective is to analyze the relationship between industry, environmental disclosure index (EDI), and profitability, i.e., whether EDI is a mediating variable between industry and profitability.

Previous studies analyze the environmentally sensitive industry effect on financial performance but do not assess the mediating impact of environmental information disclosure on the relationship between both variables. This study aims to fill this gap in the literature, confirming that the industries most likely to harm the environment companies tend to improve their financial performance if they disclose environmental information, either in annual or voluntary reports (sustainability report).

This study begins with a topic introduction, followed by a structured literature review that includes the study's theoretical framework. The following section sets out the methodology used in this research. Subsequently, the analysis and discussion of the results are presented. The last section is dedicated to the conclusions.

## 2. Theoretical framework

### 2.1. Environmental accounting and regulations on environmental matters

Following Accounting Normalization System (ANS) Conceptual Structure (Aviso no. 8254/2015, of July 29, published in *Diário da República*, 2<sup>nd</sup> series no. 146, of July 29) and according to the academic literature, the leading accounting objectives are to provide valuable and relevant information for all stakeholders on decision-making (Cepêda and Monteiro, 2020; Akhtar and Liu, 2018; Eierle and Schultze, 2013; Akdere, 2011). Accounting is a science that prepares and provides financial and non-financial information and is essential for corporate transparency (Ribeiro and Gúzman, 2010; Schwartz, 2016). There is a growing consensus that timely and broad-based stakeholder involvement is vital for effective environmental assessment (Enríquez-de-Salamanca, 2018). The environmental impact assessment is a process where several stakeholders take part with different interests and expertise, which may lead to intentional or unintentional bias in their opinions (Enríquez-de-Salamanca, 2018).

The companies' stakeholders need information related to the companies' activity environmental impact and expose the results of all initiatives developed to minimize them (Saremi and Nezhad, 2014), so their accounting system should provide helpful information for environmental management purposes and external reporting. Environmental accounting presents an opportunity for companies to address regulations cost-efficiently, avoid exposure to future regulations, and even prove to the public that additional regulations are not always necessary (Schaltegger Schaltegger and Burritt, 2017, p.13).

Environmental accounting is a branch of accounting whose function is to register and disclose the companies' actions with an environmental impact. This tool provides accurate information in the financial statements about the estimated social cost caused to the environment by the externalities of production (Anand and Srineevasa, 2014). According to Bebbington and Thomson (2007), environmental accounting is a field of accounting that records environmental events that arise from the organizations' economic actions. Schaltegger and Burrit (2000) consider that environmental accounting was born in the process of pressure exerted by stakeholders, as they considered that they would thus have greater control over the companies' environmental performance and that environmental accounting would be an essential management tool, as it would facilitate the environmental aspects integration in the strategies and decision-making definitions.

On the other hand, there are limitations and obstacles to environmental accounting. For instance, Álvarez-García and del Río Rama (2016) state that the complexity of *International Organization for Standardization* (ISO) standards, legal requirements, lack of incentives to implement the systems, lack of management commitment, lack of employee involvement and high implementation costs prevent the actual application of this branch of accounting.

In 2001, the European Community (EC) issued Recommendation 2001/453/EC on 30 May to promote greater harmonization in the annual reports of European companies on environmental matters. The Recommendation was prepared to support Single Market related policies and contribute to financial statements users receiving important and comparable information regarding environmental issues, thus reinforcing Community initiatives in the natural environment protection area. The same document indicates that the quantity, transparency and comparability of environmental information included in companies' annual accounts and management reports should also be improved. To achieve these objectives, and considering the growing importance attached to environmental problems, the EU Commission intends to clarify the current rules and provide more specific guidelines regarding the recognition, measurement and environmental matters disclosure in companies' annual accounts and management reports (Accounting Standards Committee, 2002).

This Recommendation was based on several International Accounting Standards (IAS) issued by the *International Accounting Standards Committee* (IASC) and the *International Accounting Standards Board* (IASB), which include environmental information: IAS 1; IAS 16; IAS 34; IAS 36; IAS 37 and IAS 38 (Eugénio, 2004). After the Recommendation, the Portuguese Accounting Guideline (DC) 29 - Environmental Matters, later approved by the Accounting Normalization Commission, on June 5, 2002, and published in the Official Gazette on April 18, 2005, came into force in 2006 and it was an essential step for the national regulation on environmental matters. In January 2010, there was a new change after the ANS came into force (Decree-Law No. 158/2009 of July 13, amended by Decreto-Lei No. 98/2015 of June 2). Consequently, FRAS 26 - Environmental Matters was introduced to replace DC 29 (Aviso no. 15655/2009 amended by Aviso no. 8256/2015).

FRAS 26 aims, according to paragraph 1 *"to prescribe the criteria for the recognition, measurement and disclosure of environmental expenditures, environmental liabilities and risks and related assets resulting from transactions and events that affect, or are likely to affect, the financial position and results of the reported entity"*. According to paragraph 3 of FRAS 26, *"this Standard shall be applied to the information to be provided in the financial statements and management report of the entities o as to environmental matters"*. Besides FRAS 26, other FRAS refer to environmental matters: FRAS 1, FRAS 3, FRAS 7, FRAS 19 and FRAS 21. Companies should treat environmental matters in an accounting manner to disclose correct and relevant information to stakeholders.

## 2.2. Environmental matters disclosure

Mandatory and voluntary disclosure are different ways of communicating business performance to stakeholders. Consoni and Douglas (2016, p. 659) refer that *"the nature of the relationship between mandatory and voluntary disclosure is ambiguous and may be seen as complementary or substitute"*. Environmental information disclosure is mandatory when it derives from accounting standards or the law. The information is voluntary when it results from the companies' will and not from the obligation to apply the law. Consoni and Douglas (2016) indicate that, in a regulatory logic, voluntary disclosure exceeds the information recommended by standards or law and represents a choice of managers or company directors.

The increased sensitivity of stakeholders to environmental and social issues has led companies to improve the quality of information disclosure in these areas of interest. For these reasons, there is an increasing interest in non-financial information, which makes it as relevant as financial information to all users of this information (stakeholders) (Monteiro, Garcia-Sanchez and Aibar-Guzmán, 2022; Ribeiro and Gúzman, 2010).

The ANS specifies that companies should disclose information on environmental matters when it is materially relevant for decision-making. In this case, companies must disclose information in the annual report (Notes to the Financial Statements and management report). Although Portuguese-listed companies are not subject to FRAS 26, as they apply IAS/IFRS adopted by the EU, they may disclose information in accordance with this accounting standard.

In this respect, Eugénio (2004) highlights the necessity to prepare an income statement that contains environmental expenditures and income indicators to make an accounting analysis separate from the "environmental result". The FRAS 26 is the only one that does not come from an IAS. However, listed companies apply IAS 37, which defines what companies should disclose in environmental terms concerning provisions, contingent liabilities and contingent assets.

Sustainability, social responsibility, or integrated reports emerge as a means of voluntary disclosure to stakeholders of companies' social, environmental and economic performance. Garg (2010) questions whether the content of this report should be included in the annual report or whether it should be presented independently.

However, the fact that there is no legislation requiring its preparation leads to a lack of homogeneity in form and content (Eugénio and Gomes, 2013), at least until the EU Directive 2014/95/EU entry into force.

Sustainability reporting consists in measuring, disclosing, and reporting practices to various stakeholders on environmental and social issues, offering a balanced and sensible description of companies' sustainability performance reporting, including both positive and negative information, according to the Global Report Initiative (GRI, 2007). According to GRI (2012), several reasons lead companies to voluntarily prepare a sustainability report to demonstrate commitment and be transparent; demonstrate the capacity to participate in competitive markets; plan activities; become more sustainable and position the companies and follow the legislation.

The GRI is a non-profit organization created in 1997 with the cooperation of the *Coalition for Environmentally Responsible Economies* (CERES) and the *United Nations Environment Programme* (UNEP), which issues and aims to use guidelines in the realization of sustainability reports to promote the three preambles of sustainable development rigorously and globally ([www.globalreporting.org](http://www.globalreporting.org)). The GRI guidelines, now called standards, are of voluntary application, and each one is composed of specific indicators qualitatively and quantitatively. These guidelines increase the transparency of the information disclosed about the companies' social and environmental impacts (Gauthier, 2005).

In 2000, the primitive guidelines version, G1, was launched, becoming the first global framework for sustainability reporting. The G1 was the target of several improvements in the following years, culminating in the emergence of the G2 in 2002, a new guideline with guidelines for reporting. Later, in 2006, the third generation of Guidelines (G3) appeared a version emphasizing the quality assurance of reported information. In 2011 the G3.1 guideline was launched to complete and update the G3 guidelines, with guides on reporting the impact of business actions on the local community, human rights and gender. The latest guidelines (G4), launched in 2013, aim to increase adherence to sustainability reporting for all types of organizations (KPMG, 2013). This version of the GRI comprises three universal standards (GRI 101 - Fundamentals, GRI 102 - General Content and 103 - Management Approach) and three specific topics (economic, environmental, and social).

It should be noted that in this study, namely the empirical part, the indicators of the G4 guideline were used, given that the sample period is between 2015 and 2017. Regarding the G4 guideline, the GRI Standards present similar environmental indicators. The G4 emerges with 27 new disclosures, a new structure of guidance documents and two levels to report according to the new guidelines. For those reporting on sustainability, the G4 can lead to shorter but more focused reports on materially relevant aspects, reducing information but improving quality (KPMG, 2013). Given this, the concepts of essential and comprehensive disclosure levels are considered. According to Neto and Pereira (2018), the essential information in a sustainability report contains the fundamental elements, providing a scenario about the economic, environmental, social and corporate governance impacts through indicators by area. Concerning the comprehensive information, it discloses additional clarifications regarding the organization's strategy, analysis, ethics and integrity in addition to the criteria addressed in the so-called essential information.

### 2.3. Theoretical approach

The literature suggests several theories to explain why companies disclose information voluntarily, including environmental information. Numerous studies have examined the changing state of information disclosure in the business sector, offering various theories on the tendency of business organizations to disclose information. The most commonly discussed theories include agency theory (Masum *et al.*, 2020), legitimacy theory (Serrano *et al.*, 2009; Monteiro *et al.*, 2023), stakeholder theory (Waheed and Yang, 2019), signalling theory (Monteiro *et al.*, 2023) and institutional theory (Griffin and Youm, 2018; Oliveira *et al.*, 2019). According to these theories, political, historical, socio-organizational, institutional, and cultural environments influence behavioural patterns



because an organization must justify its existence and actions to persist in these environments. This study is based on two theories widely used in environmental disclosure studies: legitimacy theory and stakeholder theory.

The legitimacy theory derives from the concept of organizational legitimacy, granting a company the right to conduct its operations according to the interests of the company (Ofoegbu, Odoemelam and Okafor, 2018). According to the same author, the main feature of the legitimacy theory is that companies can only survive if they act according to the structure of society's norms and values. The foundations of legitimacy theory argue that organizations are part of a broader social system in which they operate as an active part, i.e., organizations impact and are impacted by society and therefore need to be perceived as legitimate by society to ensure their survival (Dowling and Pfeffer, 1975; Suchman, 1995). To gain and maintain legitimacy, organizations adopt strategic orientations such as conforming to social norms and values, behaving in a socially responsible manner, disclosing information to legitimize their activities, and maintaining legitimacy in the eyes of stakeholders. Researchers have been studying the relationship between legitimacy theory and corporate social responsibility (CSR) practices. This includes examining how organizations use CSR initiatives to gain legitimacy, the role of legitimacy in shaping CSR reporting practices, and the effects of CSR on organizational legitimacy (Thomas and Lamm, 2012; Chauvey *et al.* 2015; Bachmann and Ingenhoff, 2016). Legitimacy theory is a widely used theoretical framework in accounting research (Tilling, 2004; Deegan, 2014; Deegan, 2019). It suggests that organizations have a social contract with their stakeholders, including the expectation that the organization behaves responsibly. In accounting research, legitimacy theory is often used to explain how and why organizations voluntarily disclose information, including environmental data. At the end of the 20th century, the legitimacy theory began to be used in the study of annual reports and later extended to sustainability reporting. Researchers began to explore the drivers and determinants of environmental and social disclosure, the role of legitimacy in defining reporting practices, and the impact of sustainability reporting on the legitimacy and performance of organizations.

For Hogner (1982), the social information disclosure by companies is a response to what society expects from the behaviour of the business world. According to legitimacy theory, organizations disclose information to legitimize their activities and maintain their legitimacy in the eyes of stakeholders. This is particularly relevant in the case of environmental disclosure, where organizations may be subject to public scrutiny and criticism for their environmental impact. By disclosing information about their environmental practices and performance, organizations can demonstrate that they take their environmental responsibilities seriously and are committed to sustainability. Overall, legitimacy theory provides a useful framework for understanding the motivations and implications of environmental disclosure in accounting research. It recognizes the importance of organizations' social and environmental responsibilities and the role of disclosure in fulfilling those responsibilities.

Stakeholder theory is another relevant theoretical framework used in accounting research, particularly social and environmental accounting. This theory suggests that organizations have multiple stakeholders with competing interests, including employees, customers, suppliers, and the environment. Freeman (1984) develops this theory in the organizational context considering the companies' stakeholders, referring more specifically to any person or group that may affect or be affected by the organization's actions. According to the same author, social and environmental disclosure is considered a means that helps the company better manage its relations with social and business partners. Thus, it can be seen that contrary to the legitimacy theory, where society is seen as a "whole", the stakeholder theory assumes the existence of several aggregates with different expectations (Mitchell, Agle, and Wood, 1997; Clarkson, 1995). For Deegan (2002), the stakeholder theory is more framed with the concerns of specific groups of society and the ability of different stakeholders to pressure companies to disclose environmental information. According to Ofoegbu *et al.* (2018), to survive and perform well, companies need a good relationship with their stakeholders, and one of the ways to maintain this relationship is to provide information through voluntary social and environmental disclosures to get support and connection with these same partners.

In accounting research, stakeholder theory is often used to explain why organizations make environmental disclosures and how these disclosures affect stakeholder relationships (Huang and Kung, 2010), to investigate the factors that influence environmental disclosure practices (Nassreddine, 2022), including stakeholder demands and organizational characteristics (Maon, Lindgreen and Swaen, 2010), to examine the effects of green disclosure on stakeholder relationships such as trust, satisfaction and loyalty (Kang and Hur, (2012). Thus, environmental and social topics disclosure in annual reports is a critical condition for an organization to respond to the increasing information needs of its stakeholders. In this sense, meeting the information needs of its stakeholders has become the primary reason for organizations to disclose information. Stakeholders may be interested in information about the environmental organization's footprint, its steps to reduce it, and the effectiveness of these efforts. By responding to the information interests of their stakeholders, organizations gain their trust and engagement, which favourably boosts their long-term performance. Using this theory, accounting researchers can better understand the factors that influence environmental disclosure practices and the effects of disclosure on stakeholder relationships and organizational outcomes. There has been increased focus on understanding stakeholder involvement and participation in corporate decision-making processes (Edelenbos and Klijn, 2006), the stakeholders' importance and prioritization (Boesso and Kumar, 2009), consideration of their power and legitimacy, and how organizations manage conflicting stakeholder interests (Rawlins, 2006). At the same time, there has been increasing attention to stakeholder influence and activism, particularly in corporate social responsibility and sustainability (Doh, and Guay, 2006). Thus, under this theory, the environmental and social matters disclosure in annual reports is a fundamental requirement for a company to meet the growing information needs of its stakeholders.

Although both theories recognize the (i) importance of organizational legitimacy; (ii) the significance of social expectations and norms; (iii) the critical role of disclosure and transparency in organizational behaviour; and (iv) the importance of organizations adopting socially and environmentally responsible behaviours, they differ on some key points, as shown in Table 1.

**Table 1.** Differences between Legitimacy Theory and Stakeholder Theory

Legitimacy theory	Stakeholders Theory
society, as a whole, is the primary stakeholder, and stakeholders are seen as part of a broader societal context	individual stakeholders are treated differently, with different and diverse interests and influence
takes a macro-level perspective and treats stakeholders as aggregates	takes a more granular approach, engaging with key stakeholders based on their power, legitimacy, and urgency
organizations derive their legitimacy from society's acceptance and acknowledgement of their actions	organizations derive their legitimacy from stakeholders themselves by meeting their expectations, demands, and needs
focuses on organizations' strategic decisions to respond to external pressures and the potential consequences of legitimacy threats	focuses on the inclusion of stakeholders in the decision-making process, their participation, and collaboration in shaping organizational decisions

*Source:* Authors

By combining these two theories, investigators can better understand the relationships between organizations, society, and stakeholders.

## 2.4. Relationship between Industry and EDI

In the last decades, several studies have been conducted on disclosing environmental issues and the factors influencing the EDI. Eugénio (2004) mentions that many Portuguese companies have materially relevant information on environmental matters, which is not disclosed anywhere in their reports and accounts. Later, Ribeiro

and Gúzman (2010) mention that given that environmental conservation requires both private and public entities to adopt a position of awareness and put into practice actions that lead to environmental conservation, there is an increase in interest, shown by a wide range of agents, in accounting information that goes beyond the mere financial dimension and includes information social and environmental type.

Previous studies verify that the social and environmental information disclosure level is influenced by several factors, internal and external to company (Monteiro, 2021; Mata, Fialho and Eugénio., 2018). Studies point out the activity sector as a factor that influences the companies' environmental disclosure practices (De Villiers and Staden, 2006; Monteiro and Guzmán, 2010). Empirical evidence shows that companies considered more sensitive to environmental issues tend to disclose more information about their environmental performance to obtain legitimacy with stakeholders (Monteiro and Guzmán, 2010; Monteiro, Pereira and Barbosa, 2021).

## **2.5. Relationship between EDI and Performance**

The literature on financial performance is vast. Financial performance is related to the achieved financial goals of a company. The term measures a company's financial health over time (Jihadi, Vilantika, Hashemi, Arifin, Bachtiar and Sholichah, 2021). Several authors use accounting information to assess profitability. The most common ones are, namely, return on equity (ROE), return on assets (ROA) and Earnings before interests and taxes (EBIT) (Janošová, 2018; Guillen, Natale and Polanco, 2015; Monteiro, Aibar-Gusmán, 2010).

Furthermore, Elshabasy (2018) and Pucheta-Martínez, Bel-Oms and Rodrigues (2020) state that previous empirical evidence shows mixed results because they used different indicators to assess the relationship between profitability and EDI. Numerous studies analyze the impact of financial performance on EDI; however, few studies examine the effect of the inverse relationship. In this regard, Chen, Hung and Wang (2018) state that mandatory CSR reporting firms experience a decrease in profitability using ROA and ROE; Haninun, Lindrianasari and Denziana (2018) founds that environmental reporting and performance positively impact financial information.

## **3. Methodology**

This study aims to analyze the disclosure of environmental information in corporate reports (annual and sustainability reports) and the relationship between industry and EDI and between EDI and profitability.

Considering that listed companies are the companies that disclose more information, this study is applied to Portuguese listed companies (Euronex Lisbon) ((Monteiro and Aibar-Guzmán, 2010). A total of 43 companies represented the sample by 70%, since sports corporations (4 companies) and companies that did not show any activity on the stock exchange in the last months (9 companies) were excluded. The reports period analysis is from 2015 to 2017, so the analysis is performed based on 90 observations.

Annual and sustainability reports, if any, were analyzed from 2015 to 2017. The content analysis technique is widely used in studies in the accounting area and has stood out even more in recent years in studies focused on sustainability disclosure.

As the objective is to analyze the disclosure of environmental information in mandatory reports (annual report) and voluntary reports (sustainability report, we developed two EDIs. One is called the environmental disclosure index in annual reports (EDI\_ar), and the other is the environmental disclosure index in sustainability reports (EDI\_sr).



EDI\_ar was developed based on the information required to be disclosed under FRAS 26 (Monteiro *et al.*, 2023). EDI\_rs, based on GRI guidelines, EDI\_rs includes the following categories: Materials, Energy, Water, Biodiversity, Emissions, Effluents and Waste, Products and Services. These categories comprise 34 indicators in total (Monteiro *et al.*, 2023).

EDI (EDI\_ar and EDI\_sr) is measured as follows:

$$EDIn = \sum_{n=1}^e \frac{ej}{e}$$

ej - Indicators disclosed in the reports (number)

e - Maximum of indicators (number)

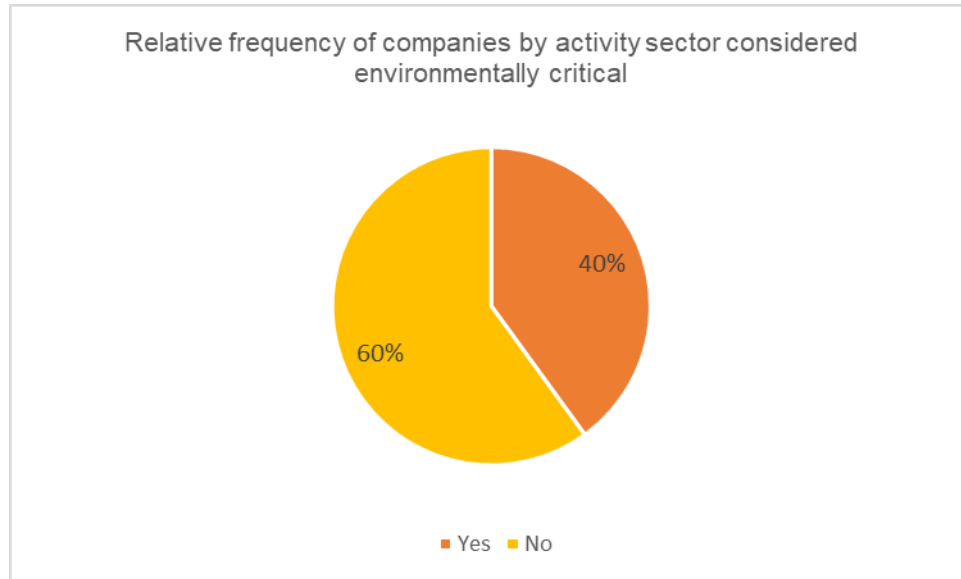
- A *Dummy* dichotomous variable will be used in the measurement of EDI variable. A specific indicator will have "1", if it is disclosed. However, if the indicator is not in the report, it will have "0".
- The industry is also a dichotomous variable that takes the value of 1 if the company belongs to an environmentally sensitive industry (energy, paper pulp and oil/gas) and 0 (zero) for all other companies (Monteiro *et al.*, 2023; Archel and Lizarraga, 2001).
- Financial performance (profitability) is measured through the indicator EBIT.

In this study, we analyzed two models: Model 1 - Analysis of the impact of industry and EDI\_ar on profitability; Model 2 Analysis of the effect of industry, EDI\_sr on profitability. Models 1 and 2 are analyzed in the Process Macro of SPSS Software.

#### 4. Analysis and discussion of results

Most Portuguese-listed companies analyzed in this study belong to the services, manufacturing and basic materials sectors (73.4%). The remaining companies operate in energy, technology, business, oil and gas and telecommunications.

For the analysis proposed, the activity sector is classified according to the proposal of Archel and Lizarraga (2001). Figure 1 shows that 40% of the companies operate in an environmentally critical sector.



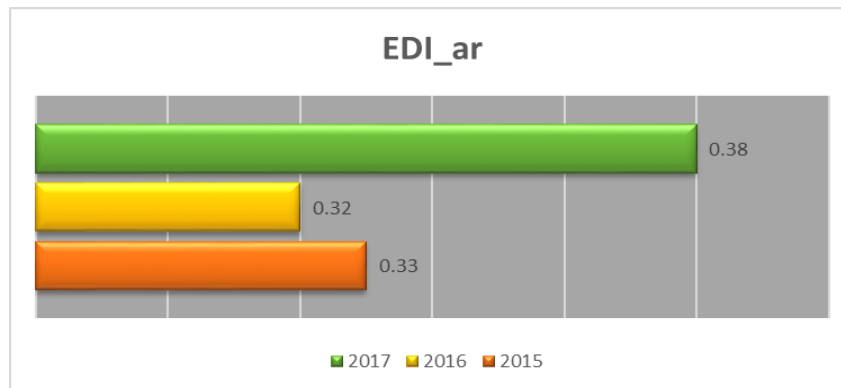
**Figure 1.** The relative frequency of companies by activity sector is considered environmentally critical.

From 2015 to 2017, we found that about 23% of the companies do not disclose environmental information in their corporate reports. Of those that do disclose information on this topic, most disclose it in the annual report, about one-tenth of the companies disclose it in the sustainability report and one third in both reports.

The first objective of this study is to analyze the evolution of EDI from 2015 to 2017 and to verify if there are differences between the evolution of EDI in the mandatory and voluntary documents.

Results show that the environmental information disclosure level is shallow in both the annual report and the sustainability report.

In the annual report, which is a mandatory document, the EDI varies from 0.33 (2015) to 0.38 (2017), showing a slight increase of 15%, although from 2015 to 2016 it has a practically insignificant negative variation (Figure 2).



**Figure 2.** EDI\_ar 2015, 2016 and 2017

EDI in sustainability reports, assessed according to the GRI indicators, show a positive evolution in all years (Figure 3). From 2015 to 2017, EDI\_sr grew by around 30%.

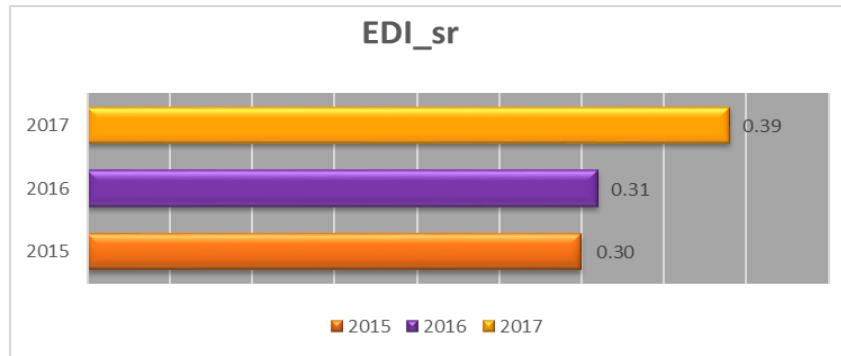
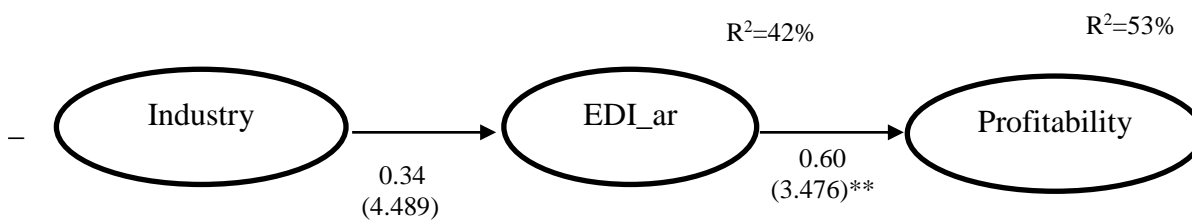


Figure 3. EDI\_sr in 2015, 2016 and 2017

Our empirical evidence reveals that EDI increased from 2015 to 2017, although the rise is more pronounced in sustainability reports (voluntary document). Results are consistent with those of Monteiro and Aibar-Guzmán (2010). These authors, for the period from 2002 to 2004, found an increase in EDI in the annual reports of large Portuguese companies.

The second study objective is to analyze the relationship between industry and EDI (in annual reports and sustainability reports) and this variable and companies' performance (profitably). Figure 4 shows the Model 1 results. In this study, the industry (environmentally sensitive) positively and significantly impacts the EDI\_ar ( $\beta=0.34$ ;  $t=4.489$ ;  $p=0.0001$ ;  $F=20.148$ ). The coefficient of determination indicates that the industry has an explanatory power of the variable EDI\_ar at 42%. Furthermore, it contributes favourably to the profitability of the analyzed companies ( $\beta=0.60$ ;  $t=3.476$ ;  $p=0.0017$ ;  $F=15.329$ ).  $R^2$  suggests that the industry and EDI\_ar variable explain a significant portion of the profitability variance (53%). Thus, EDI\_ar is a variable that mediates the relationship between industry and profitability. The results show that the industry does not have a significant and direct influence on the profitability of companies, but it has a positive impact through EDI\_ar variable ( $\beta=0.14$ ).



Note: \* significance at 0.1%; \*\* significance at 1%

Figure 4. Results to Model 1

Figure 5 presents the Model 2 results. Our empirical evidence suggests that the industry (environmentally sensitive) tends to disclose environmental information in sustainability reports ( $\beta=0.18$ ;  $t=2.091$ ;  $p=0.0457$ ). This variable variance is determined by industry in 14%. In turn, the EDI\_sr impacts profitability variance ( $\beta=0.33$ ;  $t=$

2.106;  $p=0.0447$ ). R<sup>2</sup> suggests that a significant portion of profitability variance (42%) is explained by the EDI\_sr and industry variables. Thus, the results indicate that EDI\_sr is a variable that favours profitability. As for model 1, the industry variable did not show a significant and direct relationship with profitability, but it indirectly influences the dependent variable through EDI\_sr ( $\beta=0.6$ ).

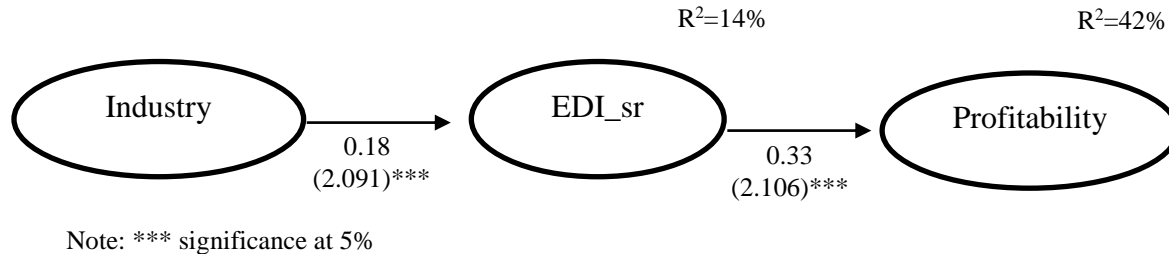


Figure 5. Results to model 2

## 5. Conclusions

Climate change and other current environmental problems put pressure on the business sector and other institutions to put into practice the notions of social responsibility and sustainable development. Thus, organizations can play a significant role in advancing the sustainable development agenda (Rosati and Faria, 2019). Moreover, accounting is essential regarding environmental sustainability because it prepares environmental information and its disclosure, which is paramount for stakeholders. The stakeholders are increasingly concerned with environmental issues and want companies to commit to these areas to benefit the company and society. Based on the stakeholder and legitimacy theories, this research aimed to investigate the disclosure of environmental information in a sample of companies listed on the stock exchange from 2015 to 2017, before Directive 2014/95/EU entered into force. In addition, it analyzed the relationship between the industry, disclosure of environmental information (EDI) and profitability, verifying whether the EDI enhances the companies' financial performance.

Regarding the environmental information disclosure evolution, the results obtained allow us to conclude that there is a positive evolution in the level of environmental disclosure by companies listed on the Lisbon stock exchange between the years 2015 and 2017. Specifically, the results show a positive variation in EDI\_ar of 5 % and EDI\_sr of 26% between 2015 and 2017. This conclusion is in line with what can be expected since environmental concerns are increasingly a prominent issue in society, so it is likely that companies develop environmentally friendly actions and disclose these same actions (Ribeiro and Gúzman, 2010, Monteiro, Pereira and Barbosa, 2021).

Deegan (2002) states that companies disclose information to legitimize an organization's operations. In the context of legitimacy and stakeholder theories, our results also show that companies that belong to industries considered sensitive in environmental terms present better levels of environmental information disclosure in their reports. In the same way, Mata *et al.* (2014), Deegan and Blomquist (2006), Deegan *et al.* (2002) found that companies that develop less environmentally friendly activities are those that disclose more environmental information in corporate reports. According to Doan and Sassen (2020), poor environmental performers have greater motivation to increase their disclosure level than solid environmental performers. Empirical evidence also indicates that companies with better EDI are the most profitable. Our results are not consistent with the study of Chen *et al.* (2018). In this study, we found that companies subject to more significant environmental risks seek to be more transparent, benefiting from the advantage of disclosure with effects on their financial performance.

The study is applied to a sample of listed companies in Euronext Lisbon. For this reason, it is not possible to generalize the results. In addition, the analysis period is limited (2015 to 2017). Finally, this research analyzes the extent of environmental information disclosure (whether disclosed or not) and not the quality of the information disclosed in corporate reports.

For future research, we suggest expanding the sample to other companies and more recent years. Future studies may also analyze the quality of environmental information disclosure in reports. This research is important for practice as it shows a positive trend in environmental information disclosure. It also provides empirical evidence that companies operating in environmentally critical industries disclose more information to legitimize their activity with stakeholders.

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