Environmental Disclosure
From the Accounting to the Report Perspective

Francisco Carreira[1], Ana Damião[1], Rute Abreu[2] and Fátima David[2]

[1]Setúbal Polytechnic Institute, Campus do IPS, Estefanilha, 2914-503 Setúbal, Portugal
[2]Guarda Polytechnic Institute, Av. Dr. Francisco Sá Carneiro, 50, 6300-559 Guarda, Portugal

Keywords: Environmental Index, Disclosure, Accounting, Reporting.

Abstract: This paper focus on the environmental disclosure (ED) promoted by firms, due to the strong demand for information and identification of the relevant data that pursuit the new legal requirements. The methodology is separate, by one side, on the theoretical framework based on the disclosure of environmental information (EI) and the true and fair view based on the accounting perspective. Indeed, the paper provides an understanding of the Patten (2002), Clarkson et al. (2008) and Monteiro (2007) researches. And, by the other side, the empirical analysis, at longitudinal and exploratory level, measures the degree of disclosure of the environmental information based on the report perspective. The authors present an Environmental Disclosure Index (EDI) and discuss the increase of the environmental reporting (ER) over the time and disclosure level of items published in the firms' annual reports listed on the Lisbon Euronext Stock Market, during the period of 2007-2009.

1 INTRODUCTION

Environmental information (EI) must help the society and firms to recognize the impact on the environment of business decisions (Milne and Patten, 2001; Kuk et al., 2005). Information systems as Carlson et al., (2001) argue: "By making use of current business information technology, such as Internet-accessible tools, and industrial environmental management tools, standards, policies and legislation an information system for EI management has been designed". The constant need of information from the EI system help managers to identify environmental risks, structure of costs and investments which need a challenge to be faced by firms. The environment could not be defended only by strictly economic results (Mendes, 2007). Indeed, environmental accounting and its reporting are, mostly, made by a voluntary character, especially when they concern the natural environment. The requirements of environmental standards, issued by International Organization for Standardization (ISO) have been the basis to many researches on environmental responsibility. To meet these demands (Fernando et al., 2010) the corporate annual report (AR) and accounting information system have been considered as one of the important

information systems to communicate with firms' stakeholders. From the literature, Gray and Collison (2002) says that the concept of sustainable development appears to challenge or defy different measures within the financial accounting economic-based model, which are nowadays the main factors of corporate success. According to this concept economic development and the natural environment's protection are jointly treated and not apart (Barros, 2008). The methodology used is: first, as a qualitative research to understand the meaning that firms and managers have pointed out to the environmental disclosure (ED): how people make sense of their world and the experiences they have in it (Merriam, 2009); and second, as a quantitative research to identify concepts, comparable metrics and make statistical treatments to classify as relevant management or accounting as a major challenge (van Dijk et al., 2014). First, authors discuss the literature review on the disclosure of EI; Second, authors present an empirical analysis, which describes the research methodology, the sample used, the data collection process and the hypotheses tested, as well as, the results obtained. Third, authors present the conclusions, limitations and proposals for future research.

2 ENVIRONMENTAL DISCLOSURE

The disclosure of EI is based on the document analysis as it is been promoted by Bowen (2009). Several studies show concerns about sustainability reporting, such as: Gray (2002, 2006), Gray and Collison (2002), Sahay (2004), Byrch et al. (2007). Although, ED is already a widespread tendency in large and small and medium firms, it does not address these issues on their AR (Sahay, 2004; Chan and Welford, 2005). Indeed, it constitutes a challenge to firms whose current environmental focus are presented on monetary terms (Lamberton, 2005; Cho and Patten, 2007). Another example are the corporate AR that, usally, disclose their "good" business practices that ensure the sustainability of the business in order to contribute to the maximization of shareholder value, but nothing related to the "bad" business practices of the environment (Chan and Welford, 2005). But, there is a danger of transmitting a false image of firms' reports, emphasizing those that are managed positively (Lamberton, 2005; DeVilliers and van Staden, 2006). Niskala and Pretes (1995) say that there are evidence about environmental reporting (ER) to be subjective, because the ED can change due to the voluntary basis. Neyland (2007) argues that these informations give more transparency to AR. Other example of disclosure could be the publication of standards by National Entities or Standard Setting Bodies in different countries about environmental responsibility. In Portugal there is a Accounting and Financial Reporting Standards 26 - Environmental Issues (CNC, 2009), that prescribes the accounting treatment for EI in terms of recognition, measurement and disclosure. However, entities with securities listed on regulated markets of the member States of the European Union (EU) and with consolidated accounts, do not apply this standard. In these cases, the application of the International Accounting Standards issued by the International Accounting Standards Board (IASB) is mandatory, since January 2005 (CNC, 2005). Undeniably, Monteiro (2007) has identified some factors that explain the ED practices in large firms that operate in Portugal. Main factors could be significantly associated with the prominence of ED among the firms included in the sample, in order to ascertain as to the existence of a significant (positive or negative) relationship between ER and financial performance. These concepts and ER seems to identify several variables based on financial accounting and as currently business success factors (Gray, 2002). As van Dick et al. (2014) defends "the most important challenge to sourcing environmental data is not always data collection per se, but often rather that collected data are too unlike, insufficiently described, and notmachine readable and therefore cannot (easily) be used in national accounts and reports". So, this research seeks to analyse the ED on behalf of good practices promoted by the firms listed on the Euronext Stock Market which it will be associated with other variables from the firms' AR disclosures.

3 EMPIRICAL RESEARCH

There is a theoretical assumption that the disclosure on environmental and social issues has a potential impact on the companies' economic and financial, environmental and social performances (Gray, 2006), because it is thought that sustainability reporting might improve corporate behavior. Many authors have been analysed the firms' AR (Niskala and Pretes, 1995; Patten, 2002; DeVilliers and van Staden, 2006; Cho and Patten, 2007). Al-Tuwaijri et al. (2004) show that the relationships between ED, environmental performance and economic performance relates these three aspects, two by two. Regarding the relationship between social and ED and financial performance, conclusions have not been entirely clear (Gray, 2006). There are many reasons for this inconclusiveness, i.e., users of financial information, and stakeholders of firms that may or may not recognize the added value of the environmental and social nature disclosures. One of the main issues that firms must disclosure to their stakeholders is the AR (DeVilliers and van Staden, 2006). This has been the main data source for most empirical studies on the ED (Barros, 2008). The methodology used in most cases is the content analysis and it aims to assess as to whether a significant, positive or negative, relation between the ED matters and some corporate factors, considered as part of the economic and financial performance, may be established. In this research it was necessary to study the population of the listed firms on the Lisbon Euronext Stock Market, during 2007-2009. In depuration process, the research concentrates mainly in the firms that belong to the PSI-20 Index. However, the final sample is not represented by 20 firms, reported to a certain date. Indeed, this study considers 24 firms that remained throughout that period as well as those that entered, continuing to consider the data of those that were excluded from the index under review. After the sample

identification, we consulted the public avaliable information, through the websites of each firm and identify the industry sectors. In the qualitative component, we conduct a content analysis of each AR and construct an EDI, following the studies of Patten (2002), Cho and Patten (2007) and Monteiro (2007). Also, Clarkson et al. (2008) developed a content analysis index, based on the GRI reporting guidelines to assess the level of discretionary ED in environmental and social responsibility reports (GRI, 2014). They included this information in the model as their ED variable presented in Table 1. The main purpose of EDI will measure the extent of information based on the firms' AR and it applies a scoring system awarding zero points in the absence of the item or one point in their presence.

Table 1: Items include on Environmental Disclosure Index.

Annual Report	
A	Environmental programmes and policies
B	Preventive measures/environmental protection
C	Compliance with environmental regulations
D	Reference to certification
E	Environmental investments/capital expenditures (past and in the current year)
F	Environmental performance/risks and impact on the environment (quantitative information)
G	Environmental indicators
H	Environmental management system
I	Training on the environment
J	External environmental audit
K	Future environmental investment & expenditures
L	Awards and recognition related to the environment
M	Mention of improvements made year by year
N	Mention of an environmental/sustainability report
O	Initiative, awareness campaign, study, conferences
Annex	
P	Measurement criteria related with the environment
Q	Environmental incentives
R	Environmental expenditures allocated to results (expenses: operating costs)
S	Environmental capitalized expenditures (investment)
T	Environmental liabilities
U	Environmental contingent liabilities
V	Environmental provisions
W	Fees/penalties relating to environmental issues
X	Heading: "Information on environmental matters"
Y	Heading "CO2 licenses"

In the quantitative component, we develop a descriptive and multivariate statistical analysis to test the 3 hypotheses formulated below (Hair et al, 2005; Greene, 2012). According to Monteiro (2007), the analysis is based on the following variables: *Environmental Reporting*. After the exploratory study of the AR of the sample firms, we evaluate all

environmental items classified them according to the items listed in Table 1 as required to be disclose in the reports according to the NCRF 26. This standard is applied to non-listed firms or to those firms excluded from consolidation procedure. The intention was to verify if these firms disclosure the information in the consolidated AR, because the statements are representative of an entire group of firms and this type of information on the environment has been considered increasingly relevant over time and it cannot be totally disregarded or overlooked when disclosing information about the whole group. The score of the EDI of each firm is obtained by dividing the total score for a firm by the number of points awarded (Monteiro, 2007). *Firm Size*. According to Hackston and Milne (1996), Legitimacy Theory withholds arguments for the existence of a size-environmental disclosure relationship. Firm size is an important factor in the disclosure of environmental matters since it has been shown in previous empirical studies that it is the larger companies that tend to disclose this type of information, according Stray and Ballantine (2000). Previous empirical evidence has shown that firm size has been indicated as a key determinant of the quantity of ED (Knox et al., 2005; Monteiro, 2007). According to Hackston & Milne (1996) the proxy used is Total Net Asset as presented on the balance sheet. *Profitability*. Neves (2002) and Penman (2013), state that a firms' financial performance can be analyzed using both accounting and market variables, knowing that accounting information is based on past performance while the market information is based on the investors expectatives about the firms performance. Acording to Neves (2002), Cho et al. (2010) and Penman (2013), the proxy used is Return on Assets as a measure of the performance. *Economic Sector*. It is also important to consider the economic sector to which a firm belongs because several sectors have different informational levels, but within each sector there are also significant differences in disclosure (Leote and Rita, 2008). In this exploratory study, the variable that distinguishes the economic sector depends on the impact they have on the natural environment (more or less significant). It is a dichotomous variable to identify sectors that are less "critical", such as: financial activities (banks), media, and information technology with zero; and if the firm belongs to a "critical" sector, such as all the others, with one. This classification is subjective and as Monteiro (2007) states: "any ad hoc grading is necessarily accompanied by a high dose of

subjectivity". The hypotheses are expected to influence the disclosure of EI by the sample, then we will answer to the significant relationships between diferente variables and disclosure of EI. The first hypothesis has been formulated: *H_{1-0}: There is no significant relationship between firm size and environmental disclosure.* This variable appears positively related to social and ED. Larger firms disclosure more information on these matters (Barros, 2008) and Patten (2002) says: "larger companies, (...), tend to disclose more information than smaller firms". Similar conclusion has been reached by Sahay (2004), Monteiro (2007) and Cho et al. (2010). This can be due to the fact that larger firms have greater visibility and consequently, social and ED can be a way to gain a better corporate reputation (Gray, 2006; Sánchez and Sottorrío, 2007). Due to this increased visibility, Knox et al. (2005) and Barros (2008) also indicate that the larger firms may be subject to greater pressure from the general public and that this "makes these present greater amounts of information" (Barros, 2008:38). By other perspective, the second hypothesis has been formulated: *H2-0: There is no significant relationship between profitability and environmental disclosure.* As Cho et al. (2010) defend: although not as consistently documented as firm size and industry affiliation, profitability (has) been shown to be significantly associated with ED. Barros (2008) argues that the relationship between the firms' profitability and the ED has been studied by several authors, but this relationship has been difficult to evaluate. Some of other studies mentioned by Monteiro (2007) and Barros (2008) reveal no significant relationship between profitability and disclosure on social responsibility, such as Hackston and Milne's (1996). The studies that suggest a positive relationship between these two aspects are fewer in number (Teoh et al., 1998; Suwaidan et al., 2004). The third hypothesis has been formulated: *H3-0: There is no significant relationship between economic sector and environmental disclosure.* The economic sector in which the firm operates seems to be related to the good ED practices (Sahay, 2004; Knox et al., 2005; Monteiro, 2007). DeVilliers and van Staden (2006) argues that "prior research indicates company size and industry are strong predictors of the quantity of environmental disclosures". The economic sectors with greater environmental impact are subject to a wide variety of environmental legislation (Barros, 2008). Firms find themselves obliged to make public their environmental performances and actions (Monteiro, 2007). Patten (2002) argues that "firms from

industries that have high sensitivity to potential environmental legislation, petroleum, chemical, metals, and paper industries, tend to make more extensive disclosures than firms from less environmentally sensitive industries." The data collected was processed and statistically analyzed using SPSS – version 17.0 for Windows. The EDI measures the degree of ER in the firms listed in the sample. These values show several firms that reach a higher score of EDI, i.e. disclosure more EI items and others that get less score as shown in Table 2.

Table 2: Firms disclosure in EDI, 2007-2009.

Firms	Environmental Disclosure Index		
	2007	2008	2009
More disclosure items	Portucel=0,64	Portucel=0,72	EDP = 0,88
	Semapa=0,60	Semapa = 0,72	EDPR = 0,84
	Cimpor=0,56	EDPR = 0,72	Semapa = 0,72
	Galp=0,56	Galp = 0,60	Portucel; Galp=0,68
Less disclosure items	Cofina=0,00	Cofina =0,00	Cofina = 0,00
	Novabase=0,00	Novabase=0,00	Impresa = 0,08
	ZON = 0,00	ZON = 0,04	BPI = 0,12
	BCP= 0,04	BCP = 0,04	BES = 0,16

Table 3 presents firms that disclose more items than those that belonging to industry sectors with a significant impact on the natural environment: building materials and fixtures, oil and gas, electricity, and paper. Those firms that disclosure less have minor impact on the environment, such as: three banks, two media branches firms and two belonging to information technology and entertainment sectors.

Table 3: Items disclosure in EDI, 2007-2009.

Number of firms	EDI		
	2007	2008	2009
More Disclosed Items			
A-Environmental programmes and policies	15	17	21
B-Preventive measures and environmental protection	14	16	18
Less Disclosed Items			
J-External environmental audit	1	---	---
U-Environmental contingent liabilities	3	2	2
W-Fees/penalties relating to environmental issues	---	1	1

The first two hypotheses were tested by examining the correlations between variables. For this purpose, we based on Hair et al (2005), Jain and Aggarwal (2011) and Greene (2012). The Pearson's statistics allows to analyze whether the variables are positively or negatively correlated and whether the

relationship between them is strong or weak. Associated to this, we have the significance level (or p-value), which concludes with the relationship between two variables is statistically significant or not. The smaller value, then better indicator when < 0,05. *Hypothesis 1 (Firm Size)*. The correlations between the firm size and the EDI are negative throughout the three-year period. Thus, one of these variables tends to increase, when the other decrease. Also, the correlation is weak because Pearson's statistics is very low (24% in 2007, 25% in 2008 and only 7% in 2009). This may imply that the two variables are not directly associated at all. According to the statistic results, the association between firm size and the ED level is not statistically relevant, whereby hypothesis 1 is not supported. *Hypothesis 2 (Profitability)*. The correlation between the profitability and EDI, during 2007-2008, Pearson's statistics is above 50%, demonstrating a positive and significant relationship between the profitability and EDI. However, in 2009, the significance level persists on p-value equal to 0,749, despite the positive correlation. Pearson's statistics is only 7,2% in 2009, reflecting a much weaker relationship between the variables than during the two previous years. The correlations between profitability and EDI present mixed values. The association between two variables is therefore inconclusive, then it is reject hypothesis 2. These results are similar to those of Freedman and Jaggi (1988), Belkaoui and Karpic (1989), Roberts (1992), Gray (2006), as opposed to those of Al-Tuwaijri et al. (2004), Teoh et al. (1998), Suwaidan et al. (2004) who found a positive relationship between profitability and ED. *Hypothesis 3 (Economic Sector)*. The T-test of the economic sector and the EDI present large differences between the mean values of the economic sectors classified as "non critical" and those classified as "critical", over the three years. Also, it is possible to conclude that the firms that belong to "critical" sectors, on average, disclosure more EI than those belonging to "non critical" sectors. The average values for the "critical" sectors are substantially higher than those of "non-critical" sectors. These same values, in both cases, tend to increase over these three years, which means that the sample tends to gradually increase the ED and determined a significant relationship between the type of economic sector in which a firm operates and its ER level: Niskala and Pretes (1995), Sahay (2004), Knox et al. (2005), Monteiro (2007). Hypothesis 3 in our study is supported.

4 CONCLUSIONS

The ED is a topic that has gained interest of many researchers from the accounting to the report perspective. Although, there is separation in the voluntary and mandatory nature of the AR, the last one is based on the accounting theory that obliges to use a more rigorous AR. The voluntary disclosure aims to answer to the report perspective of the ED focuses on the socio-political theories. Further evidence to support the previous arguments appears from the EDI that aim to measure the degree of disclosure of environmental report in firms comprised in sample, following Patten (2002), Clarkson et al. (2008) and Monteiro (2007). The EDI values, over the three years, tend to increase which allows authors to conclude that the disclosure level of ER has increased over time and there have been more and more items of environmental matters published in the firms' AR. However, we must not forget that the EDI values for one firm are not directly comparable with another. Despite these findings, several issues remain unsolved with this literature. One is related with size sample, because 24 firms introduce sample bias to the relevance of the statistical result. Another limitation is the firm size, which it could introduce size bias due to several reasons that led to the rejection of the first hypothesis and the size of these listed firms is still far from the classification as Small and Medium Enterprises. The EDI based on NCRF 26 allows firms in the sample to not apply these items from the accounting standard. The data collecting method was limited to the content analysis of the AR. It is only public available information and the degree of bias in these narratives varies systematically with the expert environment that exhibit significantly more optimism and certainty. As Milne and Patten (1996) argue, the aim is to change firms behaviour from the Stock Market, in the sense that, the focus has largely been upon what firms are doing with information rather than upon whom the actual or intended recipients might be, and what they are or are expected to be doing with information…

REFERENCES

Al-Tuwaijri, S., Christensen, T., Hughes II, K. (2004). The Relations among Environmental Disclosure, Environmental Performance, and Economic Performance: a Simultaneous Equations Approach. *Accounting, Organizations and Society*, 29: 447-471.

Barros, T. (2008). *A Divulgação de Informação sobre Responsabilidade Social nas Páginas Web das Empresas Portuguesas.* Porto: Universidade do Porto.

Belkaoui, A., Arpik, P.G. (1989): Determinants of the corporate decision to disclose social information. *AAA Journal*, 2(1): 36- 51.

Bowen, G.A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research*, 9 (2): 27-40

Byrch, C., Kearins, K., Milne, M., Morgan, R. (2007). Sustainable 'What'? A Cognitive Approach to Understanding Sustainable Development. *Qualitative Research in Accounting & Management,* 4: 26-52.

Carlson, R., Erixon, M., Forsberg, P., Palsson, A-C. (2001). System for integrated business environmental information management. *Advances in Environmental Research*, 5: 369-375.

Chan, J., Welford, R. (2005). Assessing Corporate Environmental Risk in China. *CSR and Environmental Management*, 12: 88-104.

Cho, C., Patten, D. (2007). The Role of Environmental Disclosures as Tools of Legitimacy: A Research Note. *Accounting, Organizations and Society*, 32: 639-647.

Cho, C., Robets, R., Patten, D. (2010). The Language of US Corporate Environmental Disclosure. *Accounting, Organizations and Society*, 35: 431-443.

Clarkson, P.; Li, Y., Richardson, G., Vasvari, F. (2008). Revisiting the Relation Between Environmental Performance and Environmental Disclosure. *Accounting, Organizations and Society*, 33: 303-327.

Comissão de Normalização Contabilística (CNC, 2005). *DC nº 29 – Matérias Ambientais.* Lisboa: CNC.

Comissão de Normalização Contabilística (CNC, 2009). NCRF 26 – Matérias Ambientais. *Diário da República*, 2ª série, 173, 07/09: 36.345-36.349.

DeVilliers, C., van Staden, C. (2006). Can Less Environmental Disclosure Have a Legitimising Effect? *Accounting, Organizations and Society,* 31: 763-781.

Fernando, A., Albuquerque, F., Almeida, M. (2010). As Matérias Ambientais, as Licenças de Emissão de Gases com Efeito Estufa e os Normativos Aplicáveis em Portugal. *Jornal de Contabilidade*, 395: 31-38.

Freedman, M. e Jaggi, B. (1988): An Analysis of the Association between Pollution Disclosure and Economic Performance, *AAA Journal,* 1 (2), 43 - 58

Global Report Initiative (GRI, 2014). *Sustainability Disclosure Database.* Amsterdam: GRI.

Gray, R. (2002). Of Messiness, Systems and Sustainability: Towards a More Social and Environmental Finance and Accounting. *British Accounting Review,* 34: 357-386.

Gray, R. (2006). Does Sustainability Reporting Improve Corporate Behaviour?: Wrong Question? Right Time? *Accounting and Business Research*, 65-88.

Gray, R., Collison, D. (2002). Can't See the Woods for the Trees, Can't See the Trees for the Numbers? Accounting Education, Sustainability and the Public Interest, *Critical Perspectives Accounting*,13:797-836.

Greene, W. (2012). *Econometric Analysis*. London: Prentice Hall Inc.

Hackston, D., Milne, M. (1996). Some determinants of social and environmental disclosures in New Zealand companies. *AAA Journal,* 9 (1): 77 - 108

Hair, J., Anderson, R., Tatham, R., Black, W. (2005). *Análisis Multivariante*. Madrid: Prentice-Hall

Jain, T., Aggarwal, S. (2011). *Statistical Analysis for Business.* New Delhi: VK Enterprises.

Knox, S., Maklan, S., French, P. (2005). Corporate Social Responsibility: Exploring Stakeholder Relationships and Programme Reporting across Leading FTSE Companies. *Business Ethics,* 61: 7-28.

Kuk, G., Fokeer, S., Hung, W. (2005). Strategic Formulation and Communication of Corporate Environmental Policy Statements: UK Firms' Pers-pective. *Business Ethics*, 58: 375-385.

Lamberton, G. (2005). Sustainability Accounting – a Brief History and Conceptual Framework. *Accounting Forum,* 29: 7-26.

Leote, F., Rita, R. (2008). *A Divulgação Ambiental:Volun-tária ou Compulsiva,* Huelva, Spain:*X Seminario HLEE.*

Mendes, M. (2007). *A Responsabilidade Social da Empresa no Quadro da Regulação Europeia.* Lisbon: Instituto Superior do Trabalho e da Empresa.

Merriam, S. (2009). *Qualitative research: A guide to design and implementation*. S.Francisco: Jossey-Bass.

Milne, M., Patten, D. (2001). *Securing organizational legitimacy: an experimental decision case examining the impact of ED*. APIRA Conference, 1-44

Monteiro, S. (2007), *Factores Explicativos do Grau de Divulgação Ambiental em Grandes Empresas a Operar em Portugal, XVII JHLGC*, Logroño, Spain.

Neves, J. C. (2002). *Avaliação de Empresas e Negócios*. Lisboa: McGraw-Hill de Portugal.

Neyland, D. (2007). Achieving Transparency: The Visible, Invisible and Divisable in Academic Accountability Networks, *Organization*, SAGE, 14: 499-516.

Niskala, M., Pretes, M. (1995). Environmental Reporting in Finland: A Note on the Use of Annual Reports. *Accounting, Organizations and Society*, 20: 457-466.

Patten, D. (2002): The Relation between Environmental Performance and Environmental Disclosure. *Accounting, Organizations and Society*, 27: 763-773.

Penman, S. (2013). *Financial Statement Analysis and Security Valuation.* London: McGraw-Hill/Irwin.

Sahay, A. (2004). Environmental Reporting by Indian Co. *CSR and Environmental Management,* 11: 12-22.

Sánchez, J., Sotorrio, L. (2007). The Creation of Value throu-gh Corporate Reputation. *Business Ethics* 76:335-346.

Teoh, S, Welch, I, Wong, T (1998). Earnings management and the long-run market performance of initial public offerings. *Journal of Finance,* 53: 1935–1974.

van Dijk, A., Mount, R., Gibbons, P., Vardon, M., Canadell, P. (2014). Environmental reporting and accounting in Australia, *Sci Total Environ*, 473-474, 338-349.