

Article

An Investigation of Global Reporting Initiative Performance Indicators in Corporate Sustainability Reports: Greek, Italian and Spanish Evidence

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Received: 25 February 2018; Accepted: 19 March 2018; Published: 21 March 2018



Abstract: This study has two main purposes. First, it explores the performance indicators disclosed in the Global Reporting Initiative (GRI)-based Sustainability Reports (SRs) produced by the companies of three different countries: Italy, Spain and Greece. Second, it verifies how some corporate variables, country of origin variables and “attributes” of the SRs can explain the disclosure of GRI indicators. To verify the quantity and type of the indicators disclosed, we performed a content analysis of the SRs. We use a regression trees technique to describe how the companies’ variables explain a different use of the indicators. The findings show that Spanish companies, on average, disclose the greatest number of indicators. The social indicators related to Labour are those more frequently reported in the SRs of the three countries. The least reported are social indicators related to Human Rights. The results show the central role that assurance, ROA and sector may have in classifying the disclosure level of indicators. The study contributes both theoretical and empirical literature on sustainability indicators. It also sheds further light on the determinants of the disclosure of indicators.

Keywords: sustainability indicators; Global Reporting Initiative (GRI); Greece; Italy; Spain

1. Introduction

The development of Corporate Social Responsibility (CSR) reporting has not been accomplished in a uniform manner in all countries [1,2]. Restricting our analysis to European countries, we note that Italy, Spain and the UK are the countries with the highest quality of CSR reports drawn up by Global Fortune 250 (G250) companies [3]. Companies in these countries are also those that “have demonstrated both strong communication and professionalism over time” [4] (p. 4). Among the countries of Southern Europe, Greece is the country that registered the lowest rate of diffusion of CSR reports. Greek companies seem to be much more focussed on communicating their responsibilities than on systems and reporting processes [5].

The development of CSR reporting has been accompanied by a proliferation of guidelines and standards whose adoption should improve the transparency, credibility and comparability of responsibility reporting [6,7]. Global Reporting Initiative (GRI) guidelines are de facto those guiding the design of Sustainability Report (SR) and, until now, the most used both at national and international levels [1].

The Global Reporting Initiative (GRI) guidelines, since their first version [8], have been characterized by the presence of indicators built to show the company’s economic, social and environmental performance.

Updates of the GRI guidelines and the recent approval of GRI standards [9] have enriched the set of indicators, highlighting, in this way, their relevance. Our choice to analyse GRI indicators can be

explained with different reasons. GRI guidelines are adopted by a growing number of companies and, based on GRI provisions, its indicators have been developed through GRI's multi-stakeholder processes to address aspects that the company and its stakeholders have identified as material. GRI indicators, due to their popularity, sharing construction and comprehensiveness, can be considered "the most credible sources for the extraction of CSR indicators" [10] (p. 760).

The construction of performance indicators can provide an unquestionable value added to economic, social and environmental corporate communication. Performance indicators are important instruments of analysis and monitoring, able to synthetically express complex and dynamic events.

They support the decision-making processes and the management of a company's socio-environmental matters [11–14].

A small number of studies have investigated the performance indicators disclosed in CSR reports focussing on a single typology of indicators [11,15–18], or on indicators within the full content of the CSR reports [19–21] or only on the GRI indicators disclosed in SRs [22–24]. This latter category of research is less rich in contributions from the accounting and reporting literature. Also not widespread are studies that have suggested a critical reading of the actual usefulness of sustainability indicators for the assessment of corporate performance and thus decision making [25].

To date, this study is the first attempt to analyse the use of each type of GRI-indicator in SRs by performing a cross-country comparison and by assessing whether and how corporate and "country" variables can affect the different use of these indicators. Our research aims to fill this gap in the sustainability literature.

The analysis will be developed with reference to the SRs produced by companies listed on the Stock Exchanges of three different countries: Greece, Italy and Spain. These countries have the same legal system (positive law), they belong to the same territorial context (Mediterranean countries) and, even if there are some variations among them, they have a similar culture orientation [26–28]. Despite these aspects of homogeneity, the selected countries, as already observed, are all characterised both by a different rate of sustainability reporting diffusion by maturity (very high in Italy and Spain and much lower in Greece) as well as by non-mandatory publication of SR until 2012. According to these premises, the main purpose of this research is twofold. First of all, we investigate the differences among those countries in levels of disclosure to one of the most distinctive components of these SRs, that is the sustainability indicators. In particular, we explore number and typology of GRI indicators disclosed in the SRs prepared by the firms of the three different countries above mentioned. Secondly, our research seeks to ascertain whether and how corporate variables, context variables and "attributes" of the SR can explain the disclosure of the indicators in SRs.

To verify the quantity and type of the GRI indicators disclosed, we performed a content analysis of the GRI-based reports. To describe how some companies' variables explain a different use of the GRI indicators by companies listed in the three countries, we use the Classification and Regression Trees software. The findings indicate that Spanish companies, on average, disclose the greatest number of indicators. The social indicators related to labour are those more frequently reported in the SRs of the three countries. On the other hand, the least reported indicators are indicators related to Human Rights. The results show the central role that external assurance, ROA and company sector may have to classify the disclosure level of GRI indicators.

This study makes a contribution both the theoretical and empirical literature on sustainability performance indicators. First, it paves the way to a new line of research on GRI indicators aimed to investigate their use with reference to companies from different sectors and different countries. Second, it provides new insights into the determinants of the disclosure of indicators.

The remainder of this paper is organised as follows: Section 2 provides a background on sustainability indicators and on determinants of voluntary disclosure; Section 3 explains our theoretical framework; Section 4 illustrates the sample and the research method; Section 5 outlines the main findings and the final section comments on the results achieved and presents our concluding remarks.

2. Literature Review

2.1. GRI Sustainability Reporting Indicators

Sustainability indicators are one of the most effective tools for communicating companies' sustainability performance. Therefore, it is not surprising that they were objects of different research that have focused mainly only a single category of indicators [11,12,15–17] or have examined the GRI indicators within research related to CSR reports [19–21,29]. Few studies have analysed the adoption of GRI indicators in SRs. We can classify these last part of the literature in different areas of research as showed in Table 1.

Table 1. Studies focussed on the adoption of Global Reporting Initiative (GRI) indicators.

1. GRI Indicators in the SRs of Firms from Specific Sectors				
Author(s)	Aim	Sample	Method	Findings
[30]	To provide an insight into sustainable production indicators	17 Malaysian petrochemical facilities	Questionnaire survey method and semi-structured in-depth interviews	Most of the indicators monitored and measured are related to compliance, performance and environmental impacts. There is a trend indicating a shift towards including indicators which looks into the supply chain and life-cycle issues.
[31]	To evaluate the environmental practices disclosed in Sustainability Reports (SRs)	8 oil and gas companies	Content analysis	Companies disclose their environmental performance indicators, particularly those relating to the protection or restoration of habitats, GHG and significant spills.
[25]	To analyse the measurability and interfirm comparability of sustainability performance indicators.	12 mining firms	Qualitative content analysis	The results show difficulties to create a valid comparison of the companies sustainability performance. The indicators were not comparable on an individual basis and neither were the overall situations of the firms.
2. GRI Indicators in the SRs of Firms from Different Sectors and from the Same Country				
Author(s)	Aim	Sample	Method	Findings
[32]	To verify the disclosure and the use of GRI indicators	19 Spanish Ibex-35 companies	Content analysis	The results show a significant attention to social and environmental indicators. Companies operating in certain sectors show specific indicators and report in a greater measure some indicators over others
[22]	To identify the indicators disclosed in SRs	94 Canadian companies	Content analysis	The results show differences in the use of GRI indicators among different sectors. The mining, oil and gas and electricity sectors show, in their reports, a relevant diversity of indicators. In each sector, the numbers of indicators disclosed varies widely
[23]	To verify how some variables categorise GRI indicators disclosed in SRs	47 Italian listed companies	Content analysis and regression trees technique	The results show the importance of ROE and industry in classifying companies with reference to the number and the type of indicators disclosed. The most reported category is that of social indicators related to labour practices, followed by the economic and environmental indicators

Table 1. Cont.

2. GRI Indicators in the SRs of Firms from Different Sectors and from the Same Country				
Author(s)	Aim	Sample	Method	Findings
[24]	To identify the performance indicators disclosed in SRs in a sectorial perspective	47 Italian listed companies	Explorative analysis	The oil and gas and utilities sectors disclosed the highest number of indicators. They show a more homogeneous behaviour, also with reference to core and additional indicators
[33]	To compare the companies' SRs	5 Indian public and private sector companies	Explorative analysis	Reporting on economic dimension is better than that one on environmental and social dimension, but, considerable differences were observed only in reporting practices on environmental and social performance

This review shows that none of these studies made a comparison of the use of indicators by companies of different countries and different sectors. Our study aims to fill this gap in the literature.

2.2. GRI Performance Indicators and Their Determinants

Most studies have analysed the internal and external determinants of CSR reports in full [34]. The purpose of this paper is to verify whether companies' variables (such as size, some financial performance variables and industry membership), country-of-origin variables (in particular, the national corporate responsibility index) and some "attributes" of SRs (assurance of SR) can explain the different uses of GRI indicators in SRs.

Different papers have documented the positive effect of size on sustainability reporting [35,36]. No less widespread are studies that have analysed the link between CSR disclosure and economic performance. These studies showed opposing results [36–38]. A company's sector affiliation with a "sensitive" sector is a variable capable of influencing socio-environmental disclosure [39–41].

Nationality is also a variable often used to explain the voluntary disclosure of companies. To assign a value to the nation's state of corporate responsibility, the National Corporate Responsibility Index (NCRI) can be used [42]. The NCRI is an index developed by Accountability as a part of the Responsibility Competitiveness Index. The NCRI, which is an expression of the culture of social responsibility in a given country, could be a useful variable to explain the quality of SRs issued by companies from different countries. For example, several studies have specifically documented the significance of this variable in relation to the decision to assure a CSR report [43–45].

The construction of sustainability indicators can make available a significant amount of data and information, and indicators can support the quality of disclosure. The quantity of information disclosed is not expected to be a proxy for its quality [46]. Whether you examine the quantity of information and, more so, if you consider its quality, the information is only valuable with reference to its credibility and fairness. The assurance of SRs is related to verifying reliability and compliance with the standards of information disclosed, with the aim to increase the credibility of that report [47,48]. We therefore consider that it could be useful to test whether the presence of an external assurance of SRs can also affect the sustainability indicators disclosed. Studies have extensively investigated the determinants of the external assurance of SRs [39,44] and the characteristics of the assurance statements [43,48,49]. Less common is an examination of the relationship between assurance and information provided in SRs. The authors of [50] have documented a positive relationship between external assurance and the reliability and accuracy of the environmental information provided in the Corporate Environmental Reports. They also showed, in particular, that companies that have their reports assured provide a greater amount of environmental information. So, we believe that companies are more inclined to request the assurance of an SR if their report is considered complete, reliable, and correct.

3. Theoretical Framework

Empirical studies have justified the production and development of sustainability reporting by reference to several theoretical frameworks such as stakeholder theory, legitimacy theory, signalling theory, and institutional theory [51]. Among these theoretical constructs, the institutional theory emphasises rules, regulations, ideas, and a cultural framework that characterise the social context in which companies operate. From an institutional perspective, the production of a CSR report can be explained by “stronger institutional influences” [52] (p. 274). Based on this logic, the preparation, extent and quality of a report do not necessarily follow the logic of the business but rather respond to influences produced by institutional mechanisms.

The CSR reports have gradually become part of a process of homogenization that occurs due to the action of mechanisms of institutional isomorphism [53,54]. The authors of [54] identify three mechanisms of institutional isomorphism: coercive, mimetic and normative. Coercive mechanisms lead companies to comply with prevailing rules; mimetic refers to companies’ imitation each other and normative refers to act according to values and norms [54]. According to this theoretical framework a CSR report may be the result of a “mixture of those three mechanisms” [52] (p. 283). The relevance of each element of institutionalisation may be different in each social and environmental context and in different stage of companies’ convergence around common practices [52].

Furthermore, as the indicators disclosed in the GRI-based reports are the core of our analysis, it is relevant to consider that, in literature, reporting was influenced by the general institutionalization of GRI [55,56]. Companies might use the GRI because they think that this is “the right thing to do” (normative mechanism), because these standards or guidelines are considered legitimate for the draw up of CSR reports (mimetic mechanism) or in response to pressures on their use (coercive mechanism). Thus, it can be considered that institutional theory could be helpful in the explanation of the GRI performance indicators reporting practices.

4. Empirical Analysis

4.1. Sample

Our study is focussed on all companies listed in the three countries (247 listed on the Athens Stock Exchange, 292 listed on the Milan Stock Exchange, and 179 listed on the Madrid Stock Exchange) that produced a GRI-based SR (see Table 2).

Table 2. Sample.

Listing Country	Greece	Italy	Spain
Initial sample	247	292	179
Companies that produce CSR reports without the complete application of GRI guidelines	8	7	3
Companies that produce CSR reports not GRI-based	3	10	7
Companies that do not produce CSR reports (and companies suspended from listing in 2012)	212	228	106
Final sample	24	47	63

In the final sample there are 134 companies producing SRs according to G3 or G3.1 (see Figure 1).

Figure 1 highlights that although there are differences in the sectorial classifications in the stock exchanges of the three countries, the companies of the Financial Services sector in Italy and Spain produce more GRI-based SRs, whereas in Greece, this primacy belongs to the companies of the Basic Resources sector.

Furthermore, Figure 1 shows the GRI guidelines adopted by companies, revealing a widespread use of GRI G3.1 in all countries, with the preponderance in Spain, in which they were used by 52 out of 63 companies (82.5% of the total).

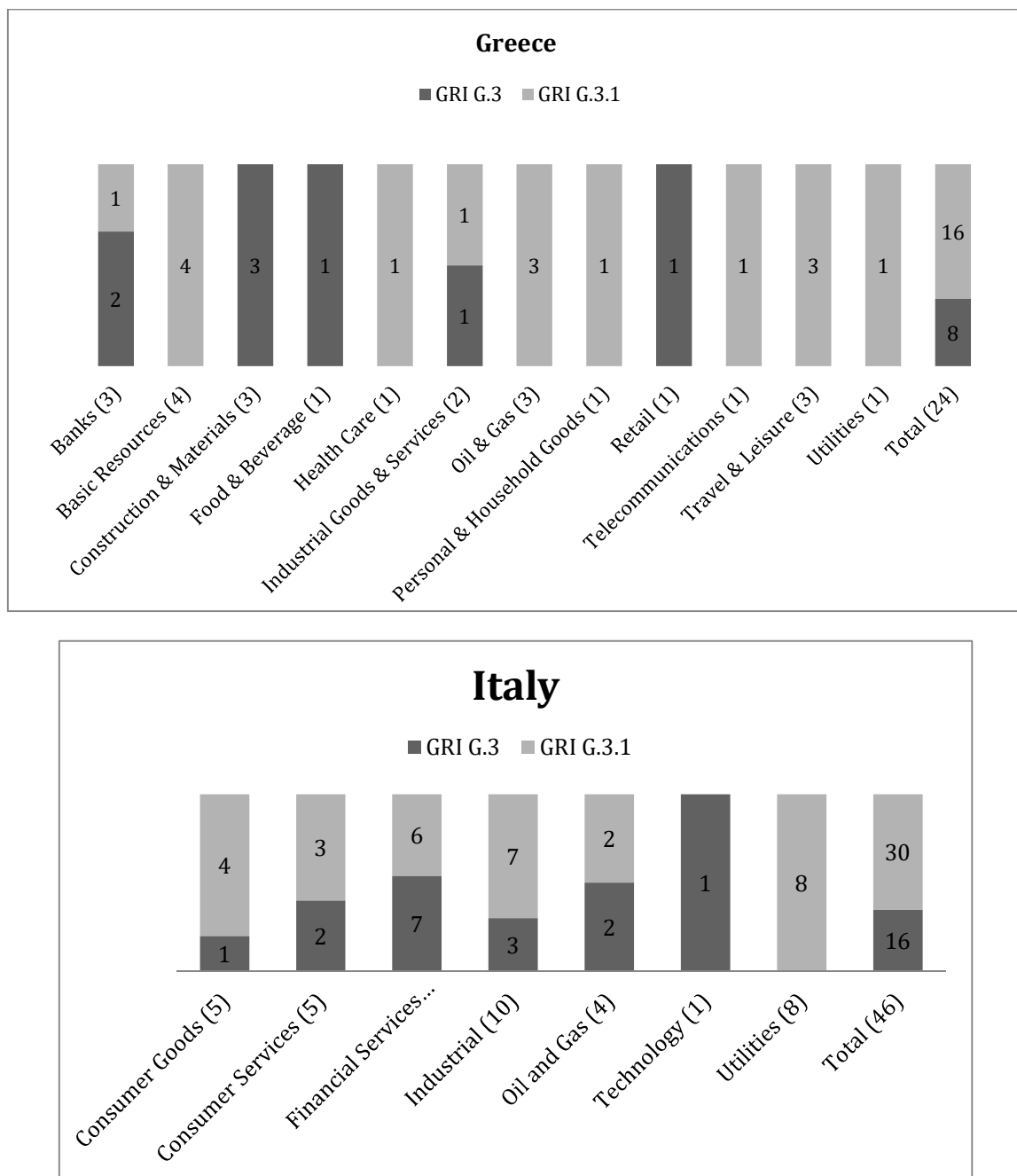


Figure 1. Cont.

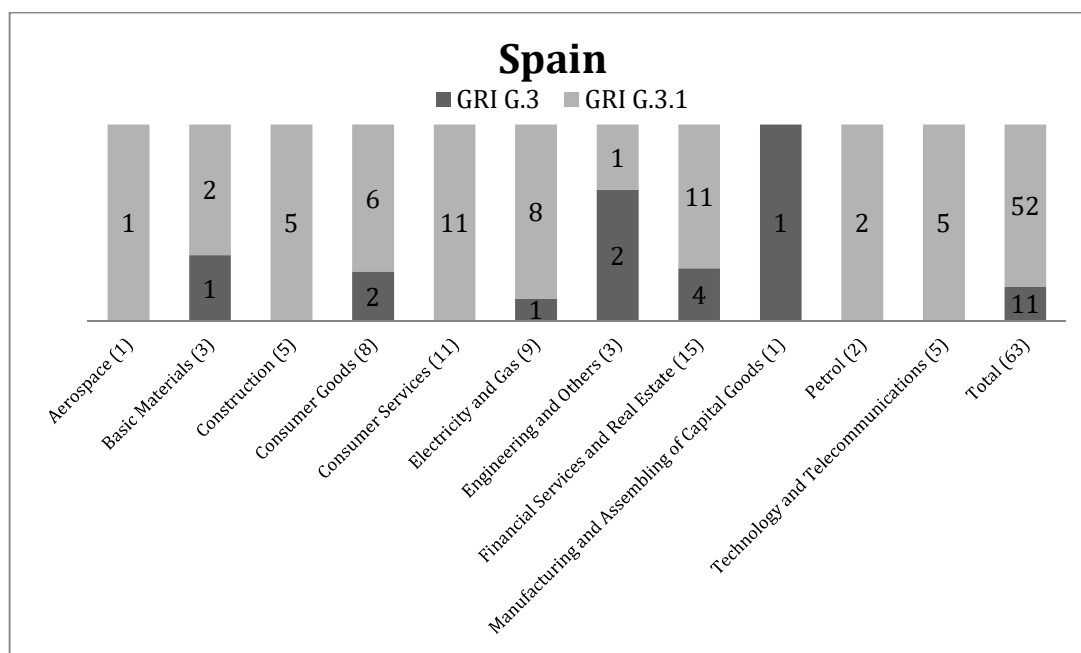


Figure 1. Companies classified per country, sector and guidelines.

4.2. Methods

This paper investigated the SRs produced by 134 companies in 2012 and downloaded by each corporate website. We collected data referred to 2012 because it is a period of time prior to 2014, when the Directive 2014/95/UE on non-financial information was approved. The approval of the directive could influence the habit to draw up sustainability reports and also their content. For example companies, according to the requirements of the Directive, might disclose non-financial information only in their management report. Moreover, in 2012, none of the three countries analysed had already imposed the mandatory publication of SRs.

To achieve our research purposes, we collected data from the GRI index, in the SRs, analysing all the G3 (79) and G3.1 (84) indicators. Content analysis [57] was used to check the presence of each GRI indicator in the SRs. Content analysis has been widely used in sustainability indicators research [23,31,32,58]. This method allows to reduce disclosure to numbers. In order to reach this aim it is necessary to develop rules for coding and recording the data [59]. In our analysis, the presence of an indicator in the SR is measured by a dummy variable coded “1”, if present, or “0” otherwise. We assigned equal weights to the different indicators [60]. Two scholars verified the GRI index and the SRs’ content, in the parts regarding the indicators, and then a dataset has been built.

A non-parametric method is applied to estimate a mathematical function $Y = F(X)$ that relates each GRI indicator (denoted by Y) to predefined firm variables (denoted by X) describing the disclosure of different performance indicators in the SRs analysed. Hence, we have employed the technique of binary segmentation [61,62]. Besides, CART software [63] has addressed the choice between the least squares method and the least absolute deviation method. As a result, this regression tree process is able, with few assumptions, to highlight the hierarchical relevance of the predefined explanatory variables in explaining the dependent variables [23].

4.3. GRI Indicators and Explanatory Variables

To investigate the typology and quantity of GRI indicators reported by companies in their SRs, we have considered the performance indicators disclosed in Part 2 “Standard disclosures” of GRI G3.1. The section on sustainability performance indicators is organised by Economic (EC n.9), Environmental (EN n.30), and Social categories. Social indicators are categorised by Labour (LA n.15), Human Rights

(HR n.11), Society (SO n.10), and Product Responsibility (PR n.9). We added another category to these, based on the total of GRI indicators (Total n.84).

Moreover, based on the literature to which we have referred in Section 2.2, we have identified six explanatory variables for performing the binary segmentation (Table 3).

Table 3. Explanatory variables measurement.

N.	Explanatory Variables	Measurement	Identification Code	Nature
1	Assurance	Dummy: SR assured = 1 SR not assured = 0	Assurance	Quantitative
2	Country	National Corporate Responsibility Index: Greece = 57.4 Italy = 56.9 Spain = 61.9	NCRIScore	Quantitative
3	Sector	ICB	Sect: 1 (Basic Materials) 2 (Oil and Gas) 3 (Utilities) 4 (Others)	Qualitative
4	Size	Ln Tot Assets	Lnatt	Quantitative
5	Profitability	Return On Assets	ROA	Quantitative
6	Profitability	Return On Equity	ROE	Quantitative

As indicated by previous research [39] we have identified as “sensitive” the following sectors: Basic Materials (7 companies), Oil and Gas (9 companies) and Utilities (18 companies). The companies of the “non-sensitive” sectors are qualified as Others (100). To eliminate differences in the names and contents of each sector as defined by the Greek, Italian and Spanish Stock Exchange, we used the “Industry Structure and Definitions” provided by the Industry Classification Benchmark (ICB).

The data dealing with explanatory variables and related to the companies’ financial statements as at 31 December 2012, were achieved via the Osiris-Bureau Van Dijck database; when not available, they were obtained through websites of the sample companies.

5. Findings

5.1. Adoption of GRI Indicators

We have created a framework to investigate the number and type of the seven categories of GRI indicators disclosed by the three countries’ companies in their SRs.

As Table 4 illustrates, all types of GRI indicators are, on average, disclosed in the SRs of the sample companies listed in the three countries (disclosure greater than 60%).

Spanish companies prevail in the amount of indicators disclosed in all GRI categories and in the Total, excepting only the social indicators related to PR, which the Greek companies provide in the greatest numbers.

Table 4. GRI indicators reported by the companies listed in Greece, Italy and Spain.

Indicators	Expected Frequency	Mean	Expected F/ Average F.	Min.	Percentile			Max.	Q.Var.Coeff.
					Q1	Q2 (Median)	Q3		
EC Greece	0–9	6.3	70%	1	4	7	9	9	0.385
EC Italy	0–9	6.8	76%	1	6	7	8	9	0.143
EC Spain	0–9	7.2	80%	0	6	8	9	9	0.200
EN Greece	0–30	21.3	71%	4	13.75	25.5	28.25	30	0.345
EN Italy	0–30	20	67%	5	16.5	21	24.5	30	0.195
EN Spain	0–30	21.6	72%	5	16	22	28.5	30	0.281
LA Greece	0–15	11.7	78%	3	10	13	15	15	0.200
LA Italy	0–15	12	80%	3	10	14	14	15	0.167
LA Spain	0–15	12.1	81%	0	10.5	13	15	15	0.176
HR Greece	0–11	6.4	59%	0	3.75	7	10	11	0.455
HR Italy	0–11	6.7	61%	0	5	6	9	11	0.286
HR Spain	0–11	7.1	65%	0	5.5	8	11	11	0.333
SO Greece	0–10	6.4	64%	0	3.75	6.5	10	10	0.455
SO Italy	0–10	7.1	71%	2	6	7	10	10	0.250
SO Spain	0–10	7.1	71%	0	6	8	10	10	0.250
PR Greece	0–9	6.4	71%	0	4.75	7.5	9	9	0.309
PR Italy	0–9	5.6	62%	0	3	5	8	9	0.455
PR Spain	0–9	6.3	70%	0	4	7	9	9	0.385
Total Greece	0–84	58.9	70%	16	41.5	66	79	84	0.311
Total Italy	0–84	58	69%	17	51.5	61	70.5	83	0.156
Total Spain	0–84	61.5	73%	12	48	66	78	84	0.238

Economic (EC), Environmental (EN), Labour (LA), Human Rights (HR), Society (SO), Product Responsibility (PR), Total of GRI indicators (Total).

The social indicators related to LA are the most reported category in the SRs of the three countries (approximately 80%). The next most used category is that of EC indicators but only for Spanish and Italian companies (80% and 76% respectively). The Greek companies instead reported more the EN indicators (71%). Conversely, the social indicators related to HR are those less frequently reported in all countries (between 59% and 65%). To this less reported category of indicators is added, then, the PR indicator, both in Italy and in Spain (62% and 70% respectively), and SO indicator in Greece (64%).

Table 5 shows that, in the three countries, the GRI indicators most widely used by the companies are the EN indicators and the social indicators related to LA. There is, however, a limited convergence around EC indicators—only for the EC1 indicator in the fourth quartile—and no common behaviour, in all quartiles, for PR indicators. Specifically, the most similarities in the frequencies of use of indicators occur in the first quartile (11 indicators in common) and in the fourth quartile (nine indicators in common). In the third quartile, this common behaviour only occurs for social indicator LA12.

The Italian and Spanish companies exhibit the most common behaviours in the disclosure of the different indicators, in particular in the second quartile (10 indicators in common) and in the third quartile (7 indicators in common).

However, there are minor similarities in the disclosure of the companies of these two countries and those of Greece. Greek companies are characterised, particularly in the first three quartiles, by a greater use of different indicators in all categories than those most frequently used by the Italian and Spanish companies, reaching the maximum differentiation in the indicator disclosures of the third quartile (13 different indicators compared with those of the other two countries). In the fourth quartile, the Italian companies use a greater number of different indicators of GRI categories (six different indicators) than the other two countries, largely represented by the social indicators.

Table 5. Frequency of use of the different types of GRI indicators.

Quartile	Greece Indicators	Italy Indicators	Spain Indicators
First Quartile	EC5; EC6; EC7 EN10; EN12; EN15; EN17; EN19; EN21; EN24; EN25; EN28; EN29 LA9; LA15 HR1; HR2; HR3; HR8; HR9; HR10; H11 SO6; SO7; SO8; SO9; S10 PR8; PR9	EC5; EC9 EN9; EN10; EN12; EN13; EN14; EN15; EN24; EN25; EN27 LA15 HR3; HR8; HR9; HR10; H11 SO9; S10 PR2; PR4; PR7	EC9 EN9; EN10; EN13; EN15; EN19; EN24; EN25; EN27; EN29 LA9; LA15 HR8; HR9; HR10; H11 SO6; SO9; S10 PR2; PR4; PR7
Tot. Quart.	29	22	22
Second Quartile	EC2; EC4 EN7; EN9; EN11; EN13; EN20; EN23; EN27; EN30 LA5; LA9; LA14 HR7 SO2; SO4 PR1; PR2; PR7	EC2 EN2; EN7; EN11; EN17; EN19; EN20; EN21; EN23; EN29; EN30 LA3; LA6; LA9; LA11 HR1; HR5 S01; SO5; SO6; SO7 PR1; PR3; PR5; PR6; PR8	EC3; EC5 EN2; EN7; EN11; EN12; EN14; EN20; EN21; EN23; EN30 LA6; LA14 HR1; HR3; HR5; HR6; HR7 S01; SO2; SO7 PR3; PR6; PR8
Tot. Quart.	19	26	24
Third Quartile	EC3; EC8; EC9 EN2; EN5; EN14; EN18; EN22; EN26 LA4; LA8; LA12 HR4; HR5; HR6 SO1; SO3; SO5 PR3; PR4; PR5; PR6	EC3; EC4; EC6; EC7 EN1; EN6; EN18; EN28 LA5; LA12; LA14 HR2; HR6; HR7 SO8 PR9	EC2; EC4; EC7; EC8 EN5; EN6; EN17 LA3; LA5; LA7; LA11; LA12 HR2; HR4 SO3; SO4; SO5; SO8 PR1; PR9
Tot. Quart.	22	16	20
Fourth Quartile	EC1; EN1; EN3; EN4; EN6; EN8; EN16 LA1; LA2; LA3; LA7; LA10; LA11; LA13	EC1; EC8; EN3; EN4; EN5; EN8; EN16; EN22; EN26 LA1; LA2; LA4; LA7; LA8; LA10; LA13 HR4 SO2; SO3; SO4	EC1; EC6; EN1; EN3; EN4; EN8; EN16; EN18; EN22; EN26; EN28 LA1; LA2; LA4; LA8; LA10; LA13 PR5
Tot. Quart.	14	20	18

5.2. Multivariate Analysis with Regression Trees

In order to classify the 134 firms of our sample into homogeneous groups based on the explanatory variables, the method of binary segmentation was applied.

We have created seven regression trees using each dependent variables. We may observe that each ramifications produced by this technique is statistically significant with values of $\alpha < 0.03$. The level of significance α of the difference test between the averages represents the stopping criterion for this iterative process. In our study, it must be below the pre-defined level equal to 0.03.

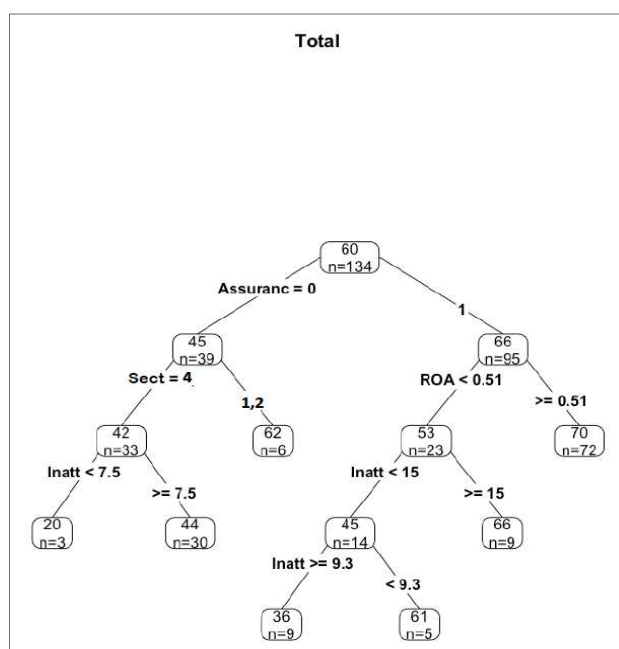
Table 6 shows the relative importance assumed by the explanatory variables in relation to each dependent variable in the construction of the segmentation trees.

Table 6. Relative values of the explanatory variables.

	Assurance	Inatt	ROA	ROE	Sect	NCRIScore
TOT	0.3473104	0.20491899	0.1916650	0.1392869	0.07663719	0.04018149
EC	0.2890072	0.23377793	0.2163756	0.1686852	0.02047607	0.07167795
EN	0.2606769	0.17800490	0.2659151	0.2344009	0.02218892	0.03881319
LA	0.2866742	0.03806965	0.2878854	0.3034315	0.06391711	0.02002224
HR	0.4706219	0.12483338	0.1450927	0.1066518	0.10356039	0.04923983
SO	0.3387567	0.20809299	0.2519985	0.1911271	0.00578276	0.00000000
PR	0.1404703	0.13834660	0.2327016	0.3432122	0.10253405	0.04273526

5.2.1. Regression Tree of Total Indicators

The regression tree (Figure 2) of total indicators (Total) starts from the root node with an average of 60 indicators. The principal split arises in relation to the variable Assurance. As shown by Table 6, this variable, compared with others, weighs relatively more (approximately 34.73%) in the construction of the tree, followed by Inatt (approximately 20.49%) and ROA (approximately 19.16%). Focusing on the others splits of the tree, on the right side there are 95 firms that submit their own SRs to assurance (Assurance = 1) and it shows a higher number of total indicators disclosed (66). The value of ROA subdivided this right node into two categories. A majority group of the companies ($n = 72$) obtained from the split have mean values of $ROA \geq 0.51$, with 70 total indicators.

**Figure 2.** Total indicators classification and regression tree.

5.2.2. Regression Trees of EC and EN Indicators

These regression trees (Figure 3) are constructed employing EC indicators and EN indicators as dependents variables.

Regarding EC indicators, once again, Table 6 shows that Assurance (with 28.90%), Inatt (with 23.37%) and ROA (with 21.63%) are the most important variables in the construction of this regression tree. With reference to EN indicators, we observe the relative importance of the Assurance (approximately 26.06%) in the construction of the tree is less than ROA (equal to 26.59%), but greater than ROE (equal to 23.44%). Beginning at the roots nodes, for both trees the principal

split occurs in relation to Assurance, with an average of 6.9 (out of a total of 9) for EC indicators, and an average of 21 (out of a total of 30) for EN indicators.

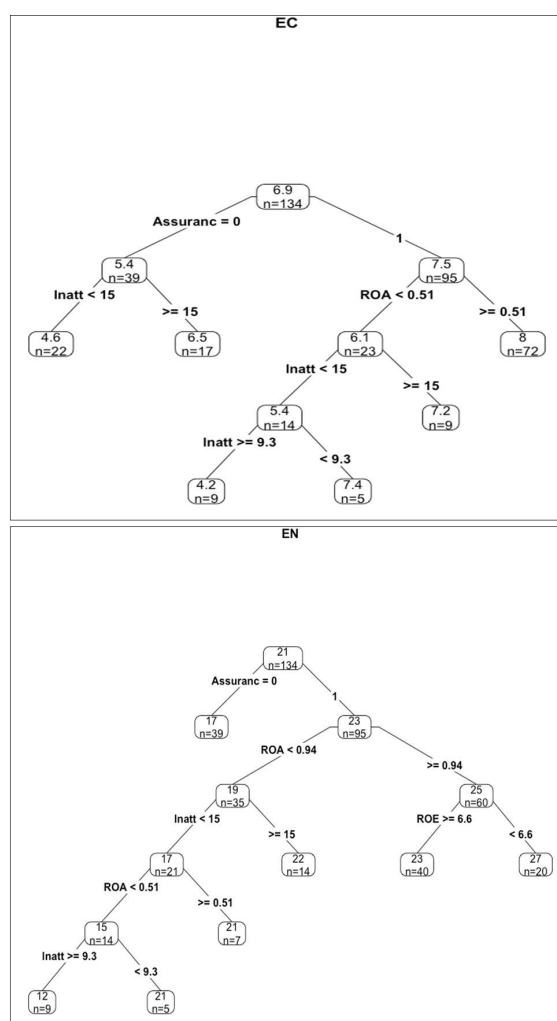


Figure 3. EC and EN indicators classification and regression trees.

Then, the right node of the EC indicators tree, defined by Assurance = 1, includes the highest number of the firms ($n = 95$), with a disclosure of 7.5 EC indicators, and, most of them ($n = 72$), increase to 8 the average of the EC indicators in accordance with the $ROA \geq 0.51$. Similarly, in the regression tree of the EN indicators, defined by Assurance = 1, there are 95 companies with a higher average disclosure of this category of indicators (23). These companies can be further segmented according to $ROA \geq 0.94$ and 60 of them increase to 25 the EN indicators reported, then they return again to 23 in the next split for levels of $ROE \geq 6.6$ ($n = 40$).

5.2.3. Regression Tree of Social Indicators

Concerning the Social indicators, we have constructed four regression trees (Figure 4) using LA, HR, SO and PR as dependent variables.

As Table 6 shows, the Assurance value plays an important role among the different explanatory variables. In detail, for HR and SO indicators, the Assurance (respectively equal to 47.06% and 33.87%) achieves a higher value compared with the other explanatory variables involved in the segmentation of the “Others” categories of these two indicators. Instead, for PR and LA indicators, the

ROE (respectively equal to 34.32% and 30.34%) has a weight relatively higher than other exploration variables do, although it segments a lower number of companies in the respective regression trees.

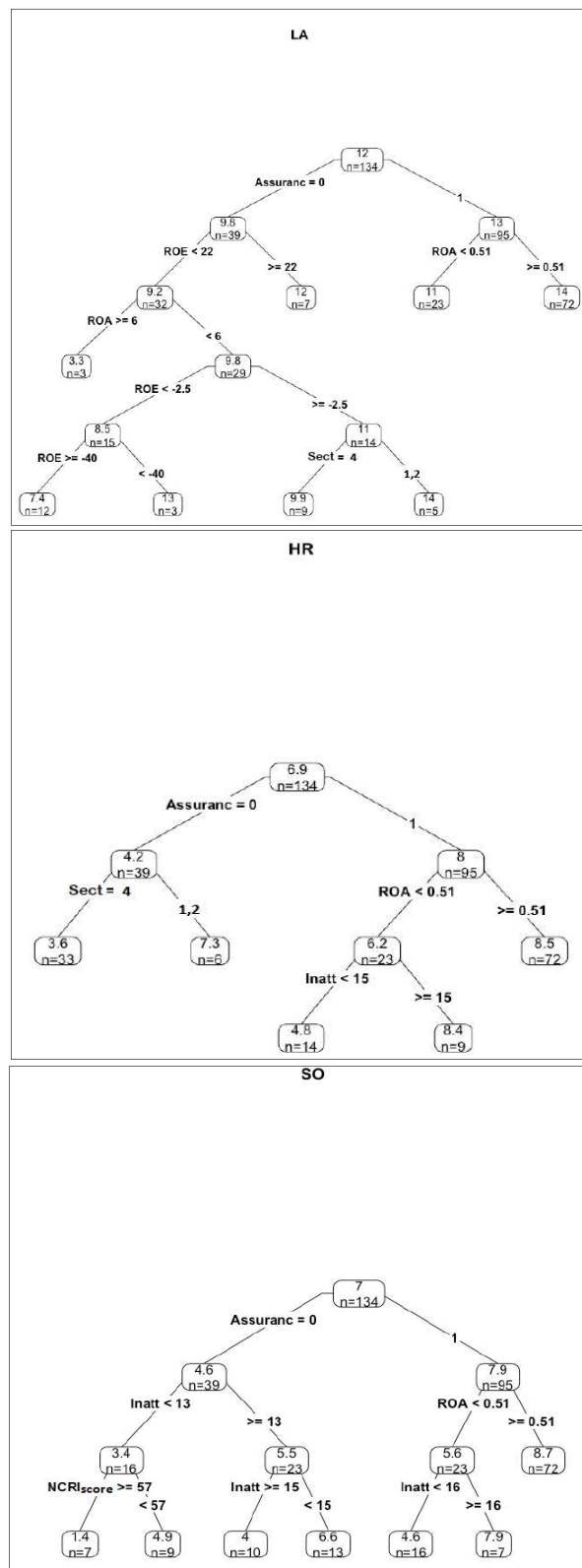


Figure 4. Cont.

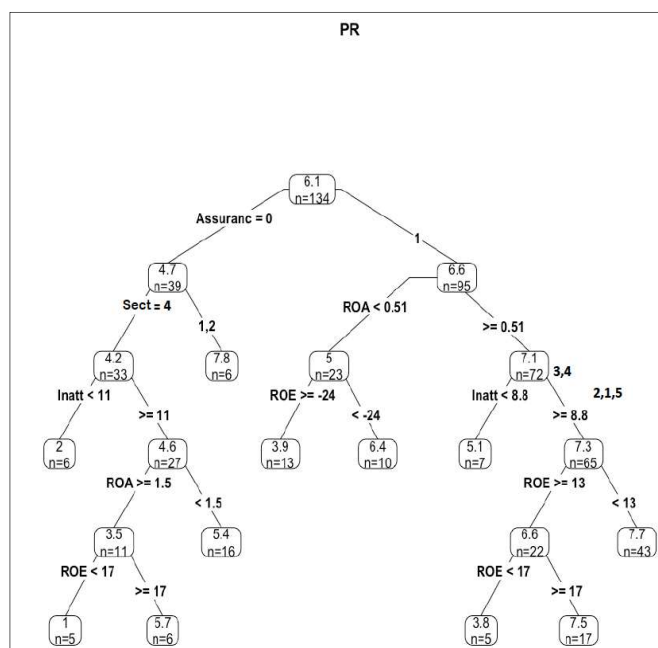


Figure 4. Social indicators classification and regression trees.

In the four regression trees of the Social indicators, starting from the root node of LA (with 12 of 15 indicators), HR (with 6.9 of 11 indicators), SO (with 7 of 10 indicators) and PR (with 6.1 of 9 indicators), the principal split occurs in relation to Assurance of the SRs.

Focusing on the most populated nodes of the all trees, the right side of them (Assurance = 1) includes the greatest number of firms ($n = 95$), with an increasing disclosure respectively equal to 13 LA indicators, eight HR indicators, 7.9 SO indicators, and 6.6 PR indicators. Then, in the second split, related to $ROA \geq 0.51$, this disclosure increases further for all Social indicators for most of these companies ($n = 72$), highlighting a substantial similarity in their behavior.

6. Discussion and Conclusions

As previously observed, only a small number of studies have investigated the economic, environmental and social indicators disclosed in CSR reports. In this study, first, we have examined number and typology of GRI indicators disclosed in the CSR reports produced by the firms of three different countries. Then, we have ascertained if and how certain corporate variables, context variables and “attributes” of the SR can explain the disclosure of the indicators in SRs.

Our analysis revealed that the sample of 134 companies report, on average, more than 60% of the GRI indicators. Spanish companies prevail in the quantity of indicators disclosed in all GRI categories, except only in the PR indicators, in which the Spanish are overtaken by the Greek companies.

This finding on Spanish companies could be explained by the maturity of the CSR reporting process in the country, which is confirmed by the high diffusion of CSR reports and their high quality [3,4].

The social indicators related to LA are those most commonly reported in the SRs of the three countries. EC indicators are the next most reported but only for Spanish and Italian companies. The Greek companies instead reported more EN indicators. Conversely, HR indicators are disclosed less commonly in all of the countries.

However, there are much greater similarities in the adoption of GRI indicators in the fourth quartile (with nine indicators in common). In this quartile, however, the Italian companies use a greater number of different indicators of GRI categories compared with indicators of the Spanish and Greek

companies (with six indicators different from the other two countries), largely represented by the social indicators.

Overall, there have been more common behaviours in the disclosure of the different categories of GRI indicators among Italian and Spanish companies, whereas Greek companies show a widespread use of different indicators in all categories.

The results obtained show several similarities with those reported in previously studies that investigated the adoption of GRI indicators in the SRs of one country [22–24,32]. For example, the EN3, the LA1 and the EC1 are the most common indicators disclosed in the research analysed.

Their widespread use in companies' analysed SRs can have at least a twofold explanation. The first is that GRI guidelines consider "core" indicators important to the most organizations although, as stated in the same guidelines, companies can decide not to present them if they are deemed not relevant. The second relates to the availability, in the companies' accounting system, of the data necessary for determining these indicators, thus facilitating their use.

The results of our study also highlight a poor disclosure of HR indicators. Companies can affect a wide range of human rights, but probably the strict legal standards on the protection of human rights, already in use in these countries, where they play their activities, have led companies to pay less attention to the voluntary disclosure of some of these indicators considered not material.

The results obtained using regression trees highlight the importance of assurance, country of listing, industry, company size, and profitability in explaining the Greek, Italian and Spanish companies' disclosure of GRI indicators.

In particular, the regression trees show whether the country of the selected companies (expressed by the proxy NCRI) revealed differences in their disclosure. Conversely, the presence or absence of assurance for their SRs and, to a lesser extent, the trend of profitability and membership in some sensitive sectors are surely the variables that best describe the numerosity of all of the types of GRI indicators reported by the companies analysed.

In fact, the companies who submit their SRs to assurance, a majority in the sample examined (95 out of 134), always report a number of indicators higher than the average in all seven categories of GRI indicators investigated.

The results obtained using regression trees show the central role of assurance as a variable able to classify the company's disclosure of GRI indicators. This finding confirms the results of other studies that revealed a positive relationship between the assurance of a CSR report and the quantity of information disclosed [50].

The results also highlight the influence of ROA, and occasionally even of ROE, in discriminating the companies' disclosure in all categories of GRI indicators analysed. The relationship between company profitability and the extent of their CSR disclosures has been studied by some authors with mixed results. Few studies have documented the existence of a positive influence of profitability on extent of disclosure [64,65].

The "sensitive" sector, however, is a variable that can explain the different number of GRI indicators disclosed, particularly for an SR without assurance. For Total, LA, HR, and PR categories of indicators, and in the absence of assurance of SRs, companies operating in the sensitive sectors, "Basic Materials" and "Oil and Gas", constantly report a quantity of indicators exceeding the average. These two sectors are typically viewed as having relevant social and environmental impact [44,66]. Such companies are thus likely to experience more pressure from consumers, government bodies and other stakeholders (both local and otherwise). These observations could justify the broader use of GRI indicators and confirm the results of other studies that showed that sector can affect CSR reporting [40,41].

Examining the results, in the three countries there is a widespread disclosure of all categories of GRI indicators. This substantial uniformity of disclosure might be produced by the socio-cultural homogeneity of these three countries [67,68] and by their legal homogeneity in terms of absence, as of the date of the analysis of the SRs, of a law that imposes on listed companies the preparation

of an SR. The literature documents that socio-cultural and legal context can explain companies' sustainability approach [69,70].

We also provide a different interpretation. According to institutional theory, as shown before, the production of CSR reports has gradually become part of a process of homogenization because of the action of mechanisms of institutional isomorphism (coercive, mimetic and normative). The disclosure approach of companies belonging to our sample might be the expression of the institutionalization of the GRI guidelines that exerts a "normative" pressure on companies. Companies tend to comply with GRI guidelines. The widespread adoption of these "global standards" can create what [55] (p. 667) qualify as an "international institutional context [...] in addition to the domestic ones"; in this "era of internationalization and harmonization, firms start to resemble one another in the area of CSR reporting, reducing the influence of the country of origin".

This paper makes several contributions to the literature. As noted above, few studies have analysed the disclosure of economic, environmental and social indicators in companies' SRs. This study enriches the literature by providing insights into sustainability performance-indicator disclosure in SRs. Compared with other works conducted on this topic, our research using regression trees highlighted the importance that some variables, that is, assurance, ROA and company sector, can have in the disclosure of indicators. Moreover, the article paves the way to a third line of research on GRI indicators in SRs aimed at investigating the adoption of the performance indicators with reference to firms from different sectors and different countries. In this way our analysis aims to respond to a call for research on the determinants of the disclosure of indicators in different sectors and different countries proposed by [22]. This study has also practical implications. Companies and sector associations might use these results to develop new sector indicators. That might be combined with those already disclosed to compose a useful minimum set of indicators. Our results might be useful for standards-setting organisations or for other organisations interested in developing and publishing standards or guidelines, for further refinement in typology, features and usability of indicators.

Our results are subject to limitations. We analysed the disclosure of sustainability performance indicators and the determinants of their disclosure only with reference to listed companies that produced a GRI-based report. Our analysis has identified and quantified the sustainability indicators disclosed in SRs, but we have not analysed the interesting topic of evaluating disclosure quality.

There are different possible approaches to develop this work. We could, for example, extend our analysis to the rich reality of non-listed companies that, particularly in Spain and Italy, produce a CSR report. We could also explore not only indicators disclosed in SRs but also indicators disclosed in other documents produced by companies. The recent development of Integrated Reporting and the adoption of the European Directive on non-financial information (Directive 2014/95/UE) emphasise the need to overcome the separation between information reported in financial reports and in other reports, underlining the need for an integrated reporting system. From this perspective, the construction of a system of indicators that summarises overall business performance could provide an overview of material information judged useful by different stakeholders. It might be also interesting to extend our study to other countries and to repeat it in the following years to have insights into the process of development and use of indicators over time.

Acknowledgments: The authors would like to thank the participant at the 6th Italian CSEAR conference (Parma, Italy, 30th June–1st July 2016) for feedback on an earlier version of this paper.

Author Contributions: Despite this article is the result of a joint work of the three authors, Lara Tarquinio was the scientific coordinator of the research and wrote the Sections 1; 2.2; 3 and 6. Domenico Raucci wrote Sections 2.1; 4.1; 4.3; 5.1, 5.2.1; 5.2.2 and 5.2.3. Roberto Benedetti wrote Section 4.2. Domenico Raucci and Roberto Benedetti wrote Section 5.2.

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

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