Business concerns regarding environmental responsibility

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Abstract

This paper reviews the relevant literature concerning corporate social responsibility (CSR). Different aspects are considered in terms of CSR and firm's performance and size, disclosure-reporting and communications as well as other recent trends in reporting. Apart from reviewing these issues we consider the diffusion of the global reporting initiatives worldwide identifying the trends in the period 1999-2017 per continent. Specifically, we perform a trend analysis for all continents exploring the mean change, in all sectors and in the Energy, in the number of large, multinational and small medium enterprises with reporting initiatives worldwide for the period 1999-2017. Europe seems to have passed from a full-grown to a downturn stage in the evolution of reporting initiative in the recent years. To a smaller magnitude this is the case for Oceania and Northern America, while Asia is in the spreading out stage with a steady expansion and Latin America and Caribbean and Africa having reached the full grown stage.

Keywords: GRI; Corporate social responsibility (CSR); Energy; Trend analysis.

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1. Introduction

Business actions addressing environmental and social issues are referred to as Corporate Social Responsibility (hereafter CSR). This conscientiousness of companies has attracted attention with CSR connecting and balancing environmental, social and economic factors. Although there is not an established definition of CRS, the European Commission [1] refers to CSR as the responsibility enterprises face for their effects on societies emphasizing that CSR is necessary and important factor for the attainment of sustainability, innovation but also competitiveness among EU companies. Similarly, the International Labor Organization defines CSR as a way in which enterprises, through their internal processes as well as through their interaction with other actors (people, communities, environment, etc.) affirm their values and principles [2].

Bowen [3] defined CSR as commitments of entrepreneurs to chase policies, decide and act in a desirable way for the objectives and the values of the society. Similarly, Frederick [4] identified the social responsibility to assure the expectations of the society. Friedman [5] emphasized the social responsibility of business in making more profits after confronting with the societal needs. Carrol [6] proposed the "pyramid of CSR" composed of economic, legal, ethical and philanthropic components. The dimensions of responsibility, responsiveness and social issues as proposed by [7] were extended by [8] and [9].

The concept of CSR has become more and more popular among large and smaller companies, which feature and promote CSR projects and practices to prove that they function in a fair and legit way, in order to survive and prosper [10]. Firms now integrate social responsibility and environmental sustainability in their business practices, gaining benefits that are not reflected in traditional economic terms, for instance customer base increase [11]. Investments in public goods have increased and firms try to reduce their negative impacts voluntarily below the levels that are required by the law [12]. The main goal of firms' socially responsible activities is to maximize the shared value, creating returns on investment

for company's shareholders while preventing adverse impacts on society and the environment [13]. There must be a balance between corporate profit and social and environmental responsibilities.

Obviously, the wellbeing of employees, customers and societies is important for a company and it has to pursue a CSR in order to broaden its brand name, to increase employees' productivity, to enlarge customers' loyalty and societies mutual concern and collaboration. In these lines CSR is an adequate business model demanding a long-run commitment [14].

The recent trends of economic globalization lead to increasing uncertainties and risks. At the same time poverty, inequalities and climate change increase these risks [15]. Coping with these issues may help corporations ensuring sustainable supply chains and markets for further development. In these lines corporate social responsibility may help as the main business initiative in dealing with these risks [16].

At the same time increasing concern for efficient environmental management together with welfare-oriented corporate tasks are attracting higher and higher public awareness. That is the implementation of adequate policies for sustainability reporting is an important task globally for governments, companies and consumers paying attention to the external effects on societies and the environment.

The concept of eco-efficiency was seriously considered in the Rio Earth Summit and under the auspices of a group of business leaders who founded the World Business Council for Sustainable Development (WBCSD). Having environmental sustainability as the main task implies the need for planning the long-run continued existence and growth of companies. In turn this depends on profitability that in the long-run is associated with both socially and environmentally responsible behavior [17].

Obviously energy produced using fossil fuels is closed related to many serious environmental problems [18]. Corporations may consume energy either directly using fossil

fuels like coal, diesel and natural gas or indirectly by buying electricity and other imported energy forms [19]. Apparently energy efficiency has to be associated with the minimization of the effects on the environment. This requires appropriate monitoring of energy use by various different sources and recording of the achieved reduction levels.

Energy utilities provide energy to households, firms etc. Energy utilities industry face challenges associated with social and environmental matters [20]. Social, economic, environmental, health and safety risks are related to the long run development of the energy sector. Nowadays, energy utilities face serious alterations from power generation to trading, influencing all activities from transmission to distribution within the supply chain [21].

CSR of energy utilities with increased renewable energy use may offer a number of benefits to societies [22]. Lu et al. [16] propose a theoretical framework for the assessment of linkages between CSR of energy utilities and sustainability in the development of the energy sector. Namely, increased energy efficiency, more RES use and decrease in GHG emissions.

This paper reviews and analyzes the existing relevant literature concerning corporate social responsibility and corporate environmental responsibility, paying attention also to the energy sector. The aim is to see the progress in Global Reporting Initiatives worldwide focusing on the different trends in each continent for large, multinational and small medium enterprises for the years 1999-2017 in all sector and in the Energy sector more specifically. The aim is to see the diffusion of CSR and the way corporations in the continents have grown in their reporting initiatives through the whole available time period and whether there signs of spreading out development or full-grown to a downturn or even signs of steadiness in the time path. Our target is to help scholars' research directions clear in terms of social and environmental responsibility.

2. Literature review on CSR issues

CSR has become an urgent strategic tool for companies rather than an option. A crucial motivating factor to undertake CSR activities includes the internal and external pressures [23]. Employees and managers are probably the most influential groups as internal stakeholders. External stakeholders such as customers, governments and regulatory authorities can also affect a firm's decision about CSR policies. The perceptions of external stakeholders can be influenced by firm's communication and actions. As far as social and political demands are concerned, the firms' managers should take them into consideration in order to operate accordingly.

CSR and environmental management improve social and environmental performance benefiting the society. Simultaneously firms may achieve competitive advantage improving their social reputation and brand image while decreasing operational costs [24]. CSR seems to be an important decision while planning policies for employees in order to improve their morale, motivation and commitment. Ali et al. [25] explored the relationship between CSR actions and organizational commitment of employees finding a positive association. Employees' managerial engagement can be enhanced through participation in social activities.

2.1. CSR in the energy sector

When it comes to the energy sector, corporate social responsibility practices are again categorized into the three main pillars: economic issues, social issues and environmental issues. The economic pillar refers not only to the profitability of the company and its financial issues, but to all the economic impacts that the company has on the community [26]. Therefore, it is expected that the company invests in research and development of new technologies and improves infrastructures, while paying the appropriate taxes and operating in a fair and transparent way [27].

Respectively, regarding the social pillar, energy companies should adopt socially responsible practices that impact the people inside and outside the company [26]. These practices include actions that contribute to social development and welfare, such as health and safety, equity and diversity, community relations and relations with NGOs, employee participation and satisfaction, etc. [27].

Focusing on the environmental pillar, corporate social responsibility plays a key role in the energy sector, particularly because climate change is an extremely important issue that has to be addressed and companies in the industry sector have a huge negative impact on the environment [39], especially during exploration and production [28]. The energy sector is possibly the main industrial sector that can have such a positive economic and social impact and contribute to welfare and development, while having a huge negative impact on the environment [27].

Energy companies are now in a more sustainable route and they are trying to be environmentally responsible, whilst being profitable [22]. Energy demand is increasing rapidly and, due to population growth and the new, modern, energy-intensive way of life, is expected to increase even more [29]. Because of that, energy companies have to reduce their negative impacts to the environment and respond to social expectations and international agreements, like the Sustainable Development Goals [30].

According to a United Nations' survey, 93% of CEOs believe that sustainability is important for the future success of a company [31]. The energy-sector companies that have integrated more CSR strategies are the ones that expand on an international level and, therefore, have an international reputation to protect and they depend more on international financial markets. Large energy companies have realized that CSR policies and strategies can have, not only environmental, but business benefits too and that CSR policies for environmental issues can benefit them more than CSR policies for social issues (human health, labor, etc) [29].

The existing literature does not include a large number of studies that refer to corporate social responsibility in the energy sector. According to [31] review article, in the period 2007-2018, 55 articles were published that focused on CSR implementation or its impact in the energy sector for various geographical areas. These studies also focused on the different drivers that could lead a company to adopt CSR policies and strategies. Lozano [32] categorizes these drivers into three categories: internal, connecting and external and [30] identify them as presented in Table 1.

Table 1: Drivers leading a company to adopt CSR policies and strategies

Internal drivers include:	Connecting drivers include:	External drivers include:
• Business strategy • Corporate culture • Cost savings and profitability • Less environmental harm and adaptation to climate change • Risk prevention and management	• Branding and reputation • Social license to operate • Reporting and disclosure	• Competitiveness • Legal framework • Social commitments • Stakeholder engagement and satisfaction

Sources: Lozano [32] and Latapí Agudelo et al. [30]

Most researchers in the existing literature have focused on case studies to identify the economic, social or environmental impact that the implementation of CSR policies by companies had. For example, Bashtovaya [33] examined the CSR strategies in BRICS countries and concluded that Russian companies report more extensively on the areas of CSR related to employees and consumers, compared to American companies. Ngoasong [34] examined five large oil and gas companies and concluded that each one of them consider CSR policies as a key of their local strategies.

Szczepankiewicz and Mućko [35] found that the approaches of Polish energy companies that they examined were very diverse, but all of them had analyzed their environmental impacts and had implemented sustainable policies and strategies. Leitoniene

and Sapkauskiene [36] found that more and more companies adopt CSR strategies and provide social information, while large and joint stock companies that are pressured for responsibility usually provide more reliable and relevant information that are related to CSR. Bhattacharyya [37], Bolton et al. [38] and Boehm et al. [39] focused on CSR policies, while Sparkes [40] and Skagerlind et al. [41] focused on the impact of CSR on the community.

Also, some empirical studies exist that examine the topic of corporate social responsibility in the energy sector. For instance, Pätäri et al. [42] used panel data and examined Granger causality between corporate social responsibility and corporate financial performance and found that there is no bidirectional causality between these two. Aguilera-Caracuel et al. [43] performed a panel data analysis for multinational companies and found that a company's social performance has a positive effect on its reputation. They also found that local or global social initiatives are the best way that a multinational company can follow, in order to improve its reputation. Finally, Feng et al. [44], in their empirical analysis, concluded that CSR policies have a positive financial short-term and long-term impact for the company that adopts them, as they can improve their profits and their economic growth.

2.2 CSR and firm's performance and size

The research about the effect of firms' voluntary social and environmental practices on financial performance is receiving increasing attention. Measuring CSR results is quite difficult, that is why many researchers try to figure out and calculate the impact of CSR activities on business performance [45]. According to Sidhoum & Serra [46] there is a positive link between economic results and environmental management suggesting that a restriction in resource use can reduce production costs. Not only environmentally friendly technologies but also improvements in employment, community and product responsibility can lead to improved firm financial results due to higher employee satisfaction and retention. A multidimensional CSR objective is suggested for better economic outcomes.

Many companies feel that CSR is an additional activity useful for public relations, especially if products do not arise any societal or environmental concerns. For firms with such products CSR activities are rather costly offering little real benefit to them [47]. Panayiotou et al. [48] claim that if CSR is not implemented strategically, it is not really important for an organization. They suggest the use of a Balanced Scorecard approach including performance indicators related to customer service and business processes along with performance indicators offered by GRI.

Cheung et al. [49] found no significant relationship between CSR and the tendency to pay dividends, although firms with higher CSR scores seem to have a higher dividend payout ratio, indicating that CSR positively affects firms' decisions on what dividends to pay. Lo and Kwan [50] notice positive stock market reactions to firms with good environmental performance. Voluntary information disclosure enhances corporate's trustworthiness and encourages more investments which in turn lead to improved stock price. Kim and Verrecchia [51] also support the view that qualitative CSR communication activities can improve stock prices.

According to Ting & Yin [52] the positive outcomes of an investment in community related CSR can outnumber the relevant costs in contrast to investments in environmental issues that seem to have no positive result in financial performance. Environmental CSR can even have a negative result on firm performance for those firms with high degree of excess control right. CSR actions focusing on the interests of primary stakeholders (customers and employees) positively influence financial performance.

Concerning firm's size a main stream of literature focuses on the adoption of CSR activities by small and medium-sized enterprises. Small firms often adopt informal actions for CSR implementation in contrast to larger ones which usually undertake strategic measures such as certifications and periodical reporting [53].

Longo et al. [54] investigated CSR of SMEs in Italy and concluded that they tend to be socially responsible since they consider it as a boost for their growth. CSR can be profitable for SMEs to create better employment opportunities. SME owners can also develop business strategies in regards to Environmental Management and CSR to get a competitive advantage by appropriately trading off among economic, environmental and social elements [55].

According to Lepoutre and Heene [56] it is difficult for small business owners to engage with CSR since they do not have sufficient time and knowledge to do so. Another restricting variable is the mindset of SME along with the limited financial resources. A significant barrier, especially for small and medium-sized enterprises to adopt environmental and CSR practices is the cost. Revell and Blackburn [57] tried to explore why SME managers are resistant to improving environmental performance and concluded that SMEs have a negative perception of sustainability, accompanied by lack of pressure from customers and the supply chain.

Despite the significant benefits of these practices CSR programs can be costly requiring additional financial resources for marketing activities. However, distraction of resources may increase costs [58]. Lower performing firms do not have sufficient human and financial resources missing the capacity to change existing business processes and undertake CSR and environmental activities [59].

This becomes more serious during economic crises. Several surveys have been conducted to examine CSR during financial crises. For instance, Yelkikalan and Nazan [60] investigated the impact of the 2008 global financial crisis on CSR activities. According to their results, CSR activities are effective methods for exploiting the opportunities originated from the crisis and companies that steadily adopt CSR will probably produce positive results.

3. CSR disclosure and management

3.1 CSR disclosure- reporting and communication

As mentioned, one of the main tasks of sustainability reporting is to enlarge firm's brand name providing positive reputation of its involvement in protecting the environment being at the same time a tough competitor for the other companies. Also, sustainability reporting motivates employees and supports corporate information [61].

Environmental disclosure refers to information about natural environment and environmental protection while social disclosure refers to information about the company's activities associated with the community or the employees. Both social and environmental disclosure is necessary for assessing the firm's impact on society and environment while measuring the effectiveness of the programs [62]. Environmental Reports illustrate a firm's environmental policy, its performance and the outcomes presenting environmental performance data to stakeholders [63].

A mainstream of literature supports that CSR disclosure significantly reduces information asymmetries [64]. Abernathy et al. [65], relying on the existing literature, emphasize that the demand for CSR reporting is growing. In addition to large companies, it seems that SMEs will also be obliged to report CSR performance metrics. CSR reports must be complete, avoiding presenting only favorable CSR performance metrics.

Ali et al. [66] reviewed the factors encouraging CSR disclosure and reporting. Firm characteristics such as company size, industry and corporate governance are considered as common drivers of CSR disclosure in developed and developing countries. Companies with high social visibility put more emphasis on social and environmental issues probably because they receive higher pressure from different stakeholders. The disclosure agenda is affected by social, political and cultural factors. They also detected serious differences between developed and developing countries. Firms in developing countries receive little pressure from the public for CSR disclosure in contrast to those in developed countries revealing the

lesser public awareness of social and environmental issues in the former countries. Adnan et al. [67] claim that CSR reporting is more prevalent in individualistic societies and societies with low power distance. CSR reporting is enhanced when social responsibility board committees exist.

Companies need to effectively communicate their CSR to a wide audience to increase the trustworthiness of their policy and formulate stakeholders' evaluations since they depend on their knowledge of a firm's social activities [68]. Online message customization enables the firm to increase the quantity and quality of the provided information, since the firm can provide detailed information at any time [69]. World Wide Web has become one of the main tools for presenting CSR information. In this way, enterprises can publish detailed reports and easily update the provided information. Social media in particular enable direct and interactive communication.

Nielsen & Thomsen [70] conducted a systematic literature review about CSR. They found that practices in alliance with stakeholders' expectations and requirements are the most appropriate for firms aiming at building or maintaining legitimacy. CSR messages and communication strategies can also affect the corporate legitimacy and it is suggested that one-way CSR communication is backed up by factual information in order to avoid green washing perceptions.

Hinze and Sump [71] reviewing the existing relevant research advise that external analysts can influence CSR engagement. A higher level of CSR-related information disclosure leads to analyst forecast accuracy and better CSR performance is associated with positive recommendations from analysts. All of these can increase a firm's performance.

Wen & Song [72] mention the stakeholder engagement strategy. This strategy involves dialogic and collaborative communication compared to other models such as stakeholder information strategy and stakeholder responsiveness strategy. Stakeholder information strategy is the most widespread kind of CSR communication promoting the

firms' activities regarding CSR, especially in an area in which the firms have previously caused or continue causing harm [73].

3.2 Recent trends in CSR reporting

The European Commission [74] underlines the existence of many international reporting frameworks for presenting non-financial information, available to be used by firms. Among them with precise information are the UNGC framework, the ISO 26000 and the GRI- Global Reporting Initiative.

The UNGC concerns every corporation, not considering size and location providing a sustainability framework. The incentive of UN GC is mainly ethical and appeared in 2000 being the largest voluntary network globally. It invites firms to be part of this organization following ten principles related to human and labor rights, environmental protection, and transparency. In Europe firms' percentage following this framework is around 45% of all participants [75], while 81% of firms embracing the UNGC principles show substantial progress on their sustainability performance [76].

ISO 26000-Guidance on Social Responsibility was published in 2010 by the International Standardization Organization (ISO) reveals completely the most important aspects of CSR having as tasks to direct companies on how to state their achievements and improvements attracting all interested customers. It is globally and commonly acceptable tool consisting of principles for sustainability reporting containing the latest instructions for successful reporting [77].

Finally, Global Reporting Initiative was founded in 1997 and has become the leading guideline for voluntary reporting [78] having as main task to augment the quality of information provided to stakeholders and creating many more benefits for the firm. In addition, it assists firms to state both positive and negative contributions in their tasks for sustainable growth [79].

In these lines, relying on GRI[1], organizations are classified as large (small, SME) if they have more (less) than 250 employees and more (less) than €50 million turnover or more (less) than € 43 million total balance sheet while they are MNE if they are large and multinational. Due to Standard Report Registration the availability of data refers to the period 1999-2017. Following GRI we have extracted the time trend for corporations with reporting initiatives in all continents as presented in Table 2. The first column refers to the continents, the next four to large, MNE, SME and the total number of corporations, while the last two columns refer to the energy sector.[2]

Table 2: Mean change in number of corporations with reporting initiatives worldwide over 1999-2017

Continents	Size				Energy Sector	
	Large	MNE	SME	Total	Energy	Utilities
Africa	23.80	3.385	1.925	29.11	0.5053	0.507
Asia	90.79	47.35	12.85	151.0	9.168	3.77
Europe	90.31	40.54	21,48	152.3	9.139	5.328
Latin America &Caribbean	42,94	11,43	8.744	63.11	5.058	2.756
Northern America	23.14	19.55	4.133	46.83	3.072	2.318
Oceania	7.549	4.534	1.981	14.09	0.953	0.716

Source: Authors' calculations relying on GRI Sustainability Disclosure Database

Similarly, Figure 1 presents graphically the evolution in the number of large, multinational and small medium enterprises with reporting initiative worldwide, while Figure 2 concentrates in the Energy sector and energy utilities. It seems that Europe and Asia move in a similar way in their evolution of large organizations with an average increase in organizations with reporting initiative by almost 91 per year in this time period. It is worth mentioning that there is an upward trend in the case of Asia throughout the time considered

[1] GRI's Sustainability Disclosure Database accessible at: https://database.globalreporting.org/

[2] For the determinants and implemetation of environmental management systems standards implementation see Halkos and Evangelinos [80] and Evangelinos and Halkos [81] while for the current status and key determinants of corporate disclosure on climate change see Halkos and Skouloudis [82, 83]. See also Global Reporting Initiative [84].

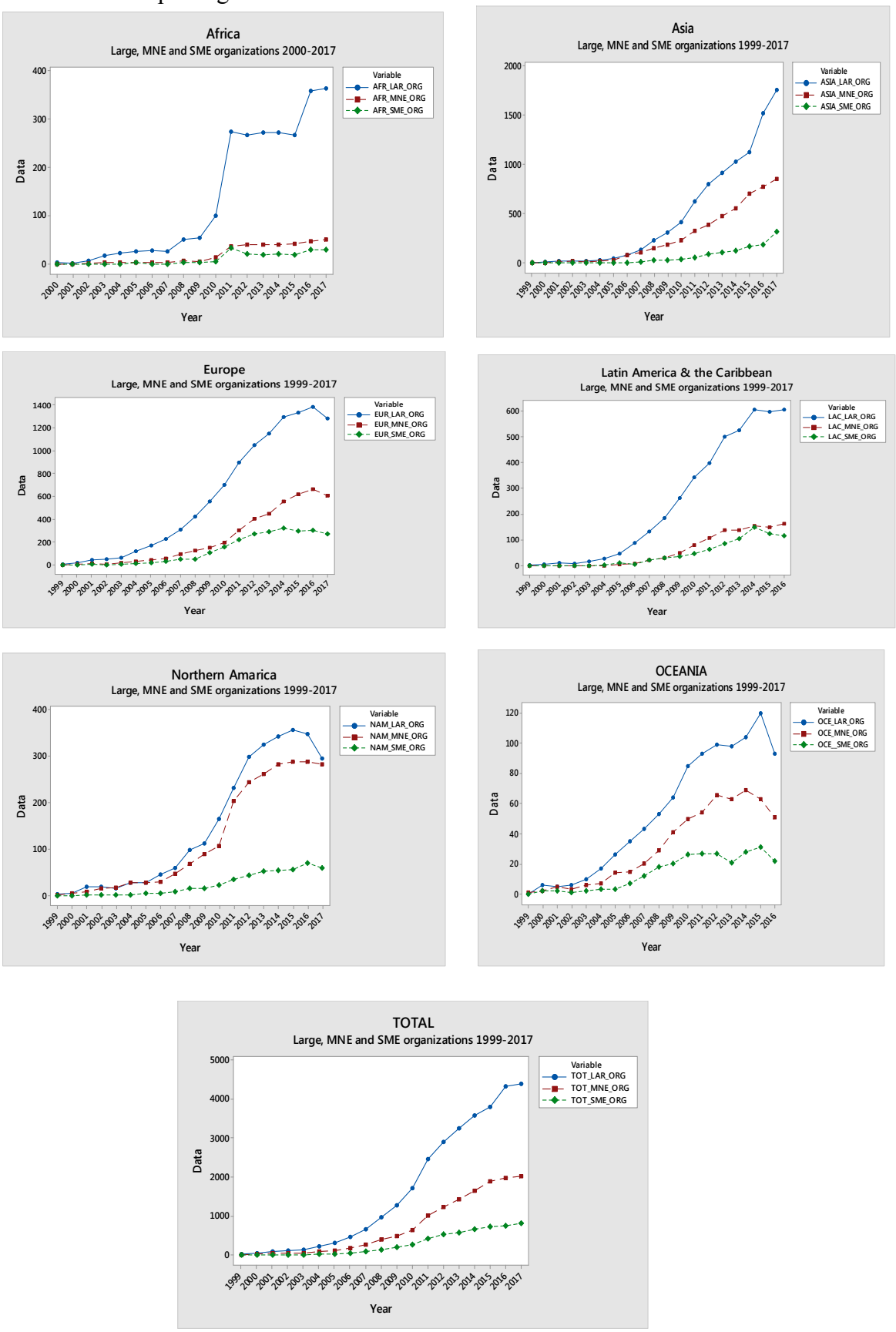
but an initial upward move followed by a downward in the recent years for Europe. A similar downward move in the recent years may be observed in the cases of Northern America and Oceania. Latin America and Caribbean follow with an average increase of almost 43 corporations yearly and then Africa and Northern America follow with around 23-24 large organizations as average per year. The same is exactly valid when we see the Energy sector with again Asia and Europe showing an average increase of 9.2, followed by Latin America and Caribbean and Northern America with an average increase of 5 and 3 organization respectively.

As can be observed, in the last years Europe seems to have moved from a full-grown to a downturn stage. This is also the case for Oceania and Northern America but to a much smaller magnitude, with Northern America showing a full-grown stage for multinational firms. Conversely, Asia is in the spreading out stage with a firm expansion path while Latin America and Caribbean and Africa seem to have reached the full grown stage.

Concerning the Energy sector, again in the last years, Europe presents the same behavior having passed from a full-grown to a downturn stage with Asia in the spreading out stage with firm development. Latin America and Caribbean and Northern America appear to have attained a full-grown stage with Oceania and showing stable growing paths but with very low magnitudes. As regards the utilities, firms with reporting initiatives give the impression to either stabilize or decline.

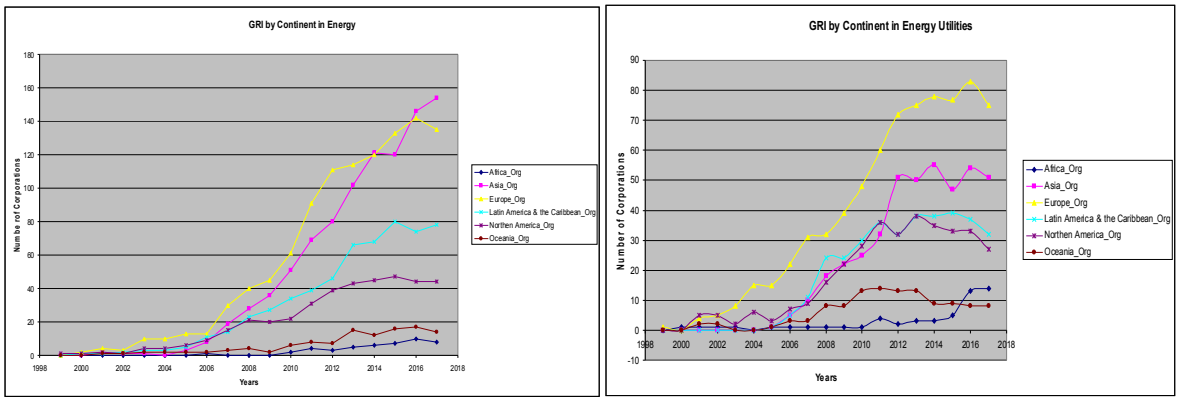
Looking at Figure 2 and referring to the Energy sector again there is a full upward trend in the case of Asia and an initial upward move but ending up downwards in the recent years for Europe for Energy while there is almost a fall in the case of utilities in the recent years in almost all continents.

Figure 1: Evolution in the number of large, multinational and small medium enterprises with reporting initiative worldwide



Source: Relying on GRI's Sustainability Disclosure Database

Figure 2: Evolution in the number of enterprises with reporting initiative in Energy and Utilities worldwide



Source: Relying on GRI's Sustainability Disclosure Database

4. Corporate Environmental Responsibility

Corporate Environmental Responsibility (CER) is the environmental aspect of CSR, implemented to address issues regarding the environmental impacts of a company and the reduction of waste disposal. A firm's ecological responsibility includes environmental actions to improve processes and products with the main goal of reducing the ecological impact of a firm [85]. Companies now adopt management practices to reduce their negative influence on the environment [86]. Achieving a win–win situation between economic development and environmental protection is a challenging management issue [87].

The literature concerning environmental CSR is still restricted but attracts increasing attention. Firms in developed countries probably receive higher pressure to undertake environmental responsibility activities. Energy management is increasingly examined in the academic literature and refers to firms' efficient energy use. According to Daddi et al. [88], environmental policy tools can be divided into three categories, namely "direct regulations, economic instruments and soft or voluntary instruments".

Voluntary reporting by firms recently received much attention. Pucheta and Gallego [89] show that firms operating in countries with higher ownership dispersion and market orientation are highly engaged with environmental reporting policy, disclosing

environmental issues voluntarily. In countries where capital market mainly supplies firms with financial resources, companies must provide their investors with higher accountability, including social and environmental disclosure. In general, social, cultural, legal and economic variables differ among countries which in turn influence environmental disclosure policies. Corporate Environmental Responsibility has a significant positive effect on firms' performance, especially for those operating in highly polluting industries and low state ownership [90]. Zou et al. [91] by utilizing institutional and agency theories conclude that mimetic forces (e.g. industrial peers) have a negative association with environmental responsibility and results.

Small firms tend to deal less with environmental responsibility since they have less relative knowledge, do not face high external pressures and have to consider other factors more crucial for their survival [92]. The importance of sustainable supply chain management seems to arise due to several factors such as climate change, demand for transparency and consumer awareness [93]. Wognum et al. [94] suggest that environmental impacts should also be considered in terms of the supply chain because it includes different stages that may produce negative environmental impacts, such as deforestation and gas emissions. Implementing systems that make the environmental impact along a supply chain visible to relevant stakeholders can be considered difficult and costly.

According to the extended literature review of Alshehhi et al. [95] more and more financial measures are used, especially market-based ones to examine the impact of sustainability practices on a firm’s financial performance. In addition to financial measures, market-based ones are also useful to offer better insights on corporate performance and predict future performance. The majority of the surveys present a highly positive relationship between sustainability practices and financial performance while there are few which support a mixed, insignificant or even negative relationship.

Many companies globally have adopted an EMS standard such as ISO 14001 and EMAS for various reasons. ISO 14001 was first introduced in 1996 while the European Eco-Management and Audit Scheme (EMAS) was introduced by the European Commission in 1993. These certifications include general requirements on how to set up and implement a management system. In 2001, the European Commission incorporated the requirements of ISO 14001 as an appendix of the EMAS Regulation, including additional requirements especially the publication of environmental performance results [96].

To receive the EMS certification, organization's premises must be subject to third party audits to verify the compliance. After the first certification audit, other visits are planned every six months or a year to ensure that the company abides by the EMS requirements. The possibility of certification cancellation exists if the requirements are not met [97]. ISO 14001 is the most renowned Environmental Management System standard, adopted by several countries [98]. In Europe, EMAS is also a widespread environmental standard promoting pollution prevention strategies and environmental reporting. The main focus of ISO 14001 regards production processes and business systems management to reduce the waste and produced pollution, signaling the company's commitment to continuous improvement of environmental performance. By utilizing such environmental management systems, companies attempt to align regulatory requirements with their overall objective, balancing environmental pollution with dynamic socio-economic needs [99].

ISO 14001 is an international standardized directive so that businesses can better manage the interactions between their functions and natural environment. Globalization and pressures from external business actors including customers, government and society have forced enterprises to turn to environmentally friendly actions [100]. Irrespective of size or operation, any business can adopt the ISO 14001 standard. Governments should encourage businesses to implement such standards. However, all enterprises should understand the difficulties involved in implementing the ISO 14001 standard as it can force them to alter

their operations, processes or even strategies to improve their internal functioning and finally benefit from it.

Our suggestion in any national CSR index construction is the consideration and use of ISO 50001 intending to take into consideration both energy performance as well as efficiency assisting enterprises to associate such practices.

5. Conclusions

Industrial pollution has caused concern to government regulators and the general public in developed and developing economies. Consumers nowadays seem to pay much attention to social and environmental problems and demand from companies to take relevant measures. Social and environmental challenges have become so complex that governments, non-profit organizations and firms should work together for the best possible results.

CSR standards have increased recently with ISO14001 leading and GRI and ISO 26000 showing a prominent role. Although there is an overlap among these standards each one of them is planned to assure explicit requirements of stakeholders [101] with governments being the most influential stakeholders in GRI implementation. We rely on GRI as it seems to be the most worldwide used standard in terms of sustainability reporting as it considers environmental, economic and social aspects. According to Berman et al. [102] GRI and ISO 14001 may pursue analogous diffusion patterns as both standards follow the same approach [103] and GRI reporting relies on ISO14001 as information source [104].[3]

Here we consider the diffusion of the GRI worldwide identifying the trends in the period 1999-2017 per continent. Specifically, we perform a trend analysis of corporations with reporting initiatives distinguishing them as large, multinational and small-medium.

[3] According to [105] ISO14001 standard follow three patterns in their diffusion: expansionist, mature and retrocession.

Observing the trends in this time period we discover that Asia and Europe behave in the same way in their growing in reporting initiatives followed by Latin America and Caribbean and Northern America. At the same time, the Energy sector (Energy and utilities) presents the same growing picture with Asia and Europe leading again and Latin America and Caribbean and Northern America following.

It is worth mentioning that Europe seems to have passed from a full-grown to a downturn stage in the recent years. To a much smaller magnitude this is also the case for Oceania and Northern America with the later having a full-grown stage for the multinational enterprises. On the other hand, Asia is still in the spreading out stage showing a steady expansion and Latin America and Caribbean and Africa having reached the full grown stage.

Looking at the Energy sector it can be seen that Europe has similarly passed from a full-grown to a downturn stage in the recent years with Asia in the spreading out stage with steady expansion. Latin America and Caribbean and Northern America seem to have reached a full-grown stage and Oceania and Africa to stabilize their growing in very low magnitudes. Regarding the utilities, enterprises with reporting initiatives seem to either stabilize or decline.

For the disclosure of CSR issues, GRI and ISO 26000 are used with the former showing the means a corporation may publicly inform for its activities while the latter reveals guides for the combination of environmental and social aspects [106]. The extent of implementation of GRI reporting depends on stakeholders pressure or importance of the brand name and market trust, the existence of legislation and the strengthening of laws [107].

Referring to developing countries CSR appears to be a lot more prominent in Asia compared to Africa and Latin America and Caribbean. Europe and Asia seem to have the highest number of GRI reporting. It is worth mentioning that North American corporations have not implemented GRI reporting to the scale expected because firms may use other ways and channels to inform societies on their sustainability policies [108].

GRI reporting may rely on consumption efficiency (materials, energy and water), and the on environmental degradation minimization (emissions, wastes and effluents) [109]. Energy and utilities together with other sectors affecting the environment and the societies like chemistry and mining have to release information using the GRI reporting on their activities allowing for more rapidly comparisons among firms in these sectors. More specific indicators that simplify the GRI reporting are necessary in order, among others, to indicate the trends and to take into consideration former, current and future targets may be also considered together with the fulfillment of protocols or conventions [110, 111]. In our case we do propose the use of national CSR indexes expanded with the consideration of energy related standards like the ISO50000.

We have proposed the use and consideration of ISO 50001 in the construction of appropriate national CSR indexes reflecting both energy performance and efficiency. As mentioned both ISO 14001 and ISO50001 may be applied either individually or together. ISO 14001 provides a firm with a qualitative glimpse at the severe environmental consequences whilst ISO 50001 looks for energy performance improvement. Accordingly, if energy is critically associated with environmental degradation and harmful consequences, ISO 50001 is more preferable than ISO 14001**.** The trends within these topics are going to envisage clear research directions in social and environmental terms.

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