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Addressing the UN SDGs in sustainability reports: An analysis of Latin American oil and gas companies

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ABSTRACT

This article aims to establish an overview of the sustainable practices developed by the major oil and gas enterprises in Latin America and analyse how these practices are related to the Sustainable Development Goals (SDGs) 7, 9, 11 and 12. The methodological strategy used was the content analysis of the sustainability reports published by companies in the sector. Considering the ten oil and gas companies with the highest revenue in Latin America, 7 of them published sustainability reports in 2020 (base 2019), and these reports were analysed via content analysis technique. The findings showed that 244 sustainable practices were reported in sustainability reports by these seven companies. These practices were summarised by twenty different keywords (the practice can be represented by more than one keyword) and related with the targets of SDGs 7, 9, 11 and 12. It was found that few practices were related with the following targets: (a) greater access of small-sized companies, especially from developing countries, to financial services (target 9.3), (b) encouragement of companies to use sustainable practices and add sustainability information in their reporting cycle (target 12.6) and (c) the rationalisation of inefficient fossil-fuel subsidies (target 12.c). However, one company stands out amongst its competitors, having practices that, on average, were related with a higher number of targets of SDGs 7, 9, 11 and 12. This research has an exploratory character. The information reported here is of great value in guiding CSR actions of companies in the oil and gas sector and future research in the area to discuss how such companies can contribute to targets 9.3, 12.6, and 12.c.

1. Introduction

In 2015, the United Nations (UN), through the document "Transforming our world: the 2030 agenda for sustainable development", presented the 17 Sustainable Development Goals (SDGs) divided into 169 targets, becoming a compass for navigating through the existing sustainability challenges (Castro et al., 2021; UN, 2015) by making it possible to integrate the focuses of sustainability that are often segmented and dispersed (Wang et al., 2019). Even seven years after the publication of the 2030 Agenda, scholars and experts agree that there is a lack of a transparent implementation approach to the SDGs. As a result, they fear that the objectives will not be attained unless urgent measures are taken to achieve the transition to a sustainable world (Castro et al., 2021; Wang et al., 2019). Considering that in the coming years the global dependence on O&G will continue (Mendes et al., 2017), the successful implementation of the SDGs in this sector is vital for sustainable development (IPIECA, IFC and UNDP, 2017).

In this sense, the role of companies should be highlighted. Wang et al. (2019) and Stafford-Smith et al. (2017) emphasise that, given the challenges related to sustainability, organizations are experiencing difficulties in recognising the relationships between targets of the SDGs and, consequently, focus on the targets related to their strategies for sustainability or on specifics SDGs that generate immediate benefits as an outcome. Castro et al. (2021) add that the synergies and trade-offs between the objectives are poorly understood and hardly reflected in companies' policy. Focusing on energetic sector, energy provision is considered essential to promote economic growth, overcome poverty, boost prosperity, expand employment and support human development, in the context of 2030 Agenda (Malaquias et al., 2019; World Bank, 2017). However, it is important to emphasise that contribution of fossil fuels to the global primary energy supply in 2018 was more than 80%, according to data from (Our World in Data, 2019).

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The oil and gas (O&G) industry, in 2017, was responsible for 56% of the global energy matrix (Mendes et al., 2017). For 2030, considering the expected annual growth in energy demand and the capacity and availability of resources to enable the expansion of renewable energies, the participation in the energy matrix of the O&G sector is estimated to decrease to approximately 54.6% (Mendes et al., 2017). Oil and gas companies have significant impacts on the development of local communities, and they invest in social projects and human rights, improve labour practices, and generate wealth for an entire nation. On the other hand, many plausible environmental impacts occur (Inkpen and Ramaswamy, 2018). Sustainably managing these impacts and developing new technologies that enable better performance and safer operations are constant challenges of oil and gas companies (Inkpen and Ramaswamy, 2018).

Considering the highly controversial nature of O&G's operations, this sector have always been involved in various types of Corporate Social Responsibility (CSR) activities, seeking to offset the environmental impact, improve the perception of the business public, build reputational capital and obtain organisational legitimacy (Borges et al., 2017; Chowdhury et al., 2019; Du and Vieira, 2012).

CSR can be defined as a "commitment that an organisation must have towards society, expressed through acts and attitudes that affect it positively" (Anholon et al., 2016). Arena et al. (2018) highlight the great diversity of definitions existing in the literature on CSR terms but point out that they all converge to the same values in general. The main point in CSR is the commitment of organisations to contribute to society and the environment beyond their legal demands (Anholon et al., 2016).

According to Asif et al. (2013), CSR offers skills to enhance the transparency and responsibility of an organisation's practices and dialogue with all stakeholders. This dialogue is essential for understanding the wishes of each stakeholder and for presenting the sustainable practices developed by the companies (Anholon et al., 2016). The disclosure of sustainability reports has become a common practice for large companies recognised in the market. The reports demonstrate corporate legitimacy within society's pressures in the search for a better future (Boiral and Heras-Saizarbitoria, 2019). In these reports, much information about a company's operations, the process's indicators, and sustainability aspects are presented, which enable researchers to use them as a rich source of information for diverse knowledge fields (Borges et al., 2017; Moraes et al., 2021).

While reviewing the literature on CSR, sustainability, and sustainability reporting, we found a research gap concerning the CSR practices of Latin America companies, especially on oil and gas sector. For example, the systematic review of the literature conducted by Latapí et al. (2019) showed that most of the CSR researches in the energy sector focuses on Europe, Asia and North America, leaving plausible gaps to be explored in other regions, such as Latin America. Beyond, Benites-Lazaro and Mello-Théry (2017) add that, in Latin America, more studies are necessary on the motivations that lead companies to implement practices linked to CSR and highlight as research gaps studies that analyse the practices developed by companies to implement the UN SDGs.

Based on the context described, the present study aims to provide an overview of the sustainable practices developed by the major oil and gas companies in Latin America and confront these practices with SDGs 7, 9, 11 and 12 (a selection was made to study the goals most strongly related to O&G sector). It is essential to highlight the originality of the article since no similar studies were identified in our literature review.

In addition to this introductory section, this article has four more sections. Section 2 is dedicated to presenting the literature review on sustainability in activities in the oil and gas sector in Latin America. Section 3 presents the methodological procedures used, and Section 4 presents the results of this study, followed by Section 5 that explains the associated debates and Section 6 that presents the policy implications. Finally, Section 7 shows the conclusions and final considerations. The references used are mentioned at the end.

2. Literature review

2.1. Corporate social responsibility in Latin America

Social responsibility experiences in Latin America are diverse, with issues related to regulation, enforcement, and compliance. An inconsistency in the implementation of CSR programs and divergent findings are observed in actions developed by companies in this region (Pozas et al., 2015).

The emergence and spread of CSR in Latin America (LA) has their origins in philanthropy and dates back to the 1990s (Benites-Lazaro and Mello-Théry, 2017; Pozas et al., 2015). However, the development of CSR in Latin America is still at the beginning stages of development, since there are problems in its conceptualization, application and implementation of strategies (Benites-Lazaro and Mello-Théry, 2017; Pozas et al., 2015). Lázaro and Gremaud (2016) state that despite the initiatives growing in recent years, CSR implementation still occurs very unevenly in the region and presents many opportunities for improvement.

To obtain better results in terms of CSR in Latin America (LA), companies need to overcome some deficiencies and limitations, such as the lack of reliable and complete data to evaluate a company's current CSR status: the lack of reliable information regarding CSR practices, in which people trust; problems related to the integration of CSR practices in central business operations; and problems in understanding and coordinating the interests of different stakeholders, amongst others (Pozas et al., 2015). Suescun Pozas et al. (2015) highlight that the Ethos Institute of Business and Social Responsibility in Brazil is an important organisation that disseminates CSR standards in the LA and Caribbean region.

Lázaro and Gremaud (2016) highlight that CSR in LA countries gains relevance because several production activities in the region generate highly negative environmental impacts. Amongst these issues, natural resource extraction and high-energy consumptions should be mentioned. However, the close relationship between CSR and companies marketing and image in LA countries generates doubts about why companies adopt CSR practices and their capacity to satisfactorily address issues such as environmental degradation and poverty (Pozas et al., 2015).

In the LA case, CSR practices are usually published in voluntary reports (Correa-Garcia et al., 2020). These reports address sustainability aspects in addition to financial information traditionally published by companies. In this sense, sustainability reports are a broader source of information to stakeholders (Correa-Garcia et al., 2020). Furthermore, when developed according to the Global Reporting Initiative (GRI) standard guidelines, that represent global best practices for public reporting of economic, environmental, and social impacts, the quality and credibility of this information are increased (Boiral and Heras-Saizarbitoria, 2019; GRI, 2021a; Mahmoudian et al., 2020). The GRI is an independent international organization founded in 1997 that provides the world's most widely used standards for sustainability reporting (GRI, 2021b, 2021a).

In LA, in general, CSR practices developed by companies do not follow any regulation from the governments. Thus companies can, at any time, abandon CSR activities due to problems such as financial crises (Benites-Lazaro and Mello-Théry, 2017). This is evidenced in the literature. In Panwar et al. (2014), authors show a relationship between company financial problems and reduced social and environmental initiatives.

According to Benites-Lazaro et al. (2017), social protection can be mentioned as a reason companies adopt CSR practices since these practices can support local communities in which companies are inserted and protect them from the negative impacts of a globalised market. This motivation is more relevant in countries where the state is weak in providing infrastructure and public goods, such as in the LA region, where CSR can alleviate problems related to the scarcity of essential services (Benites-Lazaro and Mello-Théry, 2017). Companies in LA con-

sider CSR practices as a way to address social and environmental issues (Pozas et al., 2015).

2.2. Oil and gas sector overview

Based on the increasing importance of the sustainable development concept, business organisations must be responsible for the negative consequences on society and the environment generated by their operations (George et al., 2016). These expectations are more significant in sectors with a strong damage potential, such as companies in the O&G sector (George et al., 2016).

The O&G industry is of fundamental importance for sustainable development since oil and gas are essential for the global energy system and, consequently, are engines of social and economic development (IPIECA, IFC and UNDP, 2017). Furthermore, Malaquias et al. (2019) argue that energy consumption increases when countries grow, which increases the relevance of energy for economic development. However, despite its relevance for the countries' economies, the O&G industry presents a high potential of adverse environmental impacts on the environment and local communities (George et al., 2016).

The sector is identified as a controversial industry by many advocates of corporate sustainability due to its capacity for environmental damage, such as in the air, water and land (Inkpen and Ramaswamy, 2018). According to Chowdhury et al. (2019) and Borges et al. (2017), due to their type of operations, the O&G industry is involved in various CSR activities to reduce their negative environmental impacts and improve their public image.

Because the O&G industry is highly globalised, criticised in several CSR issues, and dominated by a few and large companies, CSR aspects are more complex. Companies in the sector deal with different people, governments, cultures and countries in different levels of development (Berkowitz et al., 2016). In addition, the O&G sector presents a value chain subdivided into three main areas: the upstream business (related to exploration and production); the midstream business (related to storage, trade and transportation of crude oil and natural gas); and the downstream business (related to refining, distribution, retail and wholesale); this makes CSR issues drastically different in each business (Berkowitz et al., 2016).

Another relevant aspect highlighted by Inkpen and Ramaswamy (2018) is that in most countries in which O&G are produced, the state owns the natural resources and companies (partially or totally state-owned) are in charge of managing these resources. The authors add that these companies control most of the world's oil and gas reserves and production. In addition, it is expected that future productions in the sector will happen in locations dominated by these companies. Therefore, national O&G companies belong to one of the largest categories of global companies that will have a broad impact on sustainability (Inkpen and Ramaswamy, 2018).

The O&G industry contributes to sustainability in several manners, including the generation of jobs, providing access to energy, paying substantial taxes and other types of revenue to the governments, developing technologies and products through investments in research and development, encouraging local products/services and entrepreneurship with associated training benefits, investing in local communities, and managing the negative social and environmental impacts of its operations (IPIECA, IFC and UNDP, 2017).

However, considering the SDGs, the O&G industry presents several challenges regarding negative impacts, such as damages in biodiversity, climate change and impacts on communities (IPIECA, IFC and UNDP, 2017). Finally, IPIECA, IFC and UNDP (2017) conclude that the O&G sector may contribute to the SDGs by reducing negative and increasing the positive impacts. Latapí et al. (2019) emphasise the importance of energy companies in meeting demands related to sustainability in order to be able to operate, be competitive and retain well-qualified employees.

3. Methodology

This research presents an applied, qualitative approach. Regarding the objectives, the study is exploratory, since as mentioned in Section 2, studies related to Corporate Social Responsibility practices developed by companies in the oil and gas sector in Latin America (LA) have been explored to only a small extent. To achieve the results, the following steps were carried out: (1) bibliographic research on Corporate Social Responsibility in Latin America and sustainability in the oil and gas sector; (2) collection of sustainability reports of the major oil companies in Latin America; (3) report content analysis through the guidelines presented by Elo and Kyngäs (2008); and (4) establishment of the results discussion and conclusions. Fig. 1 presents the steps followed in this research.

The literature review was conducted in these scientific bases: Emerald Insight, Science Direct, Scopus, Springer, and Wiley. The search was conducted during the months September, October and November 2020 using the following key terms: "sustainability + sustainable development + oil and gas", "sustainability reports + oil and gas", "sustainability reports + energy", "sustainable development goals + sustainability reports", "corporate social responsibility + energy", "corporate social responsibility + stakeholders management" + "corporate social responsibility + Latin America" and "sustainability + sustainable development + Latin America". Several articles were selected, and their contents were analysed in detail to construct the introduction and literature review.

In the second step of the study, the most relevant companies in the oil and gas sector in Latin America were selected (considering these companies' revenue in 2018 according to Statista (2019)). The sustainability reports published in 2020 for the year 2019 were analysed when publicly available by the company. Table 1 presents the ten most relevant Latin companies in the oil and gas sector and indicates those for which sustainability reports were available. In total, seven sustainability reports comprised the sample considered in the study. 85% of the companies analysed are state-owned, confirming the statements of Inkpen and Ramaswamy (2018) about the general profile of the organisations in this sector.

It is worth mentioning that the Company A Distributor, despite belonging to the oil and gas sector, is different from the others because it acts only in the distribution stage of the oil and gas production chain. However, its data were considered because its revenue ranks it as one of the ten most relevant companies in this sector (Statista, 2019). Another relevant point was the public share offering of Company A Distributor, making it a private company and no longer a subsidiary of Company A. Thus, this company's data until July 29, 2019, the date of the closing public offering, were extracted from Company A's sustainability report.

In the third phase of the research, the content analysis of the sustainability reports was carried out using the guidelines proposed by Elo and Kyngäs (2008). There are two initial considerations made by the authors: (1) the content analysis is flexible, and there is no correct manner to conduct it. Researchers should evaluate which variations are better for their problems, making the analysis process more challenging and interesting; (2) the detailed description of the entire content analysis process increases the credibility of the results.

If there is little previous knowledge about the subject under analysis, if that knowledge is fragmented or if the categories are emerging from the analysis itself, the inductive approach is recommended; instead, if a conceptual structure or framework guides researchers, they can use the deductive approach (Elo and Kyngäs, 2008).

In the preparation phase, it is important to define a unit of analysis, which may be a word or a theme (Elo and Kyngäs, 2008). In this research, the unit of analysis was: "sustainable practices reported in sustainability reports by companies in Latin America in the oil and gas sector". Initially, the authors of this study read the sustainability reports to familiarise themselves with the companies' documents and the sub-

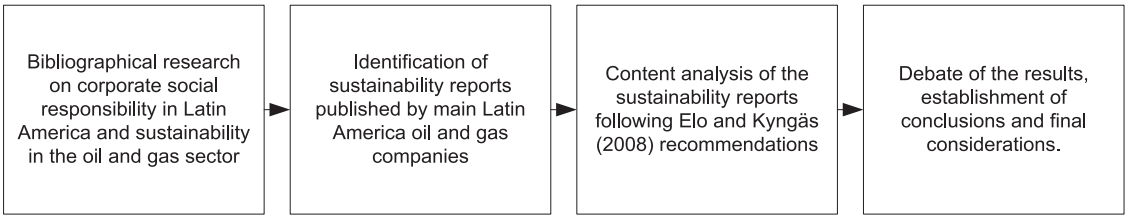

Fig. 1. Steps of the research (Source: Authors).

Table 1
Selected companies (Source: Authors).

Companies	Countries	2019 Sustainability Report published in 2020?	Report analysed?
Company A	Brazil	Yes	Yes
Company G	Mexico	No	No
Company A Distributor	Brazil	Yes	Yes
Company H	Venezuela	No	No
Company F	Argentina	Yes	Yes
Company D	Colombia	Yes	Yes
Company C	Ecuador	Yes	Yes
Company E	Chile	Yes	Yes
Company I	Bolivia	No	No
Company B	Peru	Yes	Yes

ject, as recommended by Polit and Beck (2004) and cited by Elo and Kyngäs (2008).

The next step is the data organisation phase. For inductive analysis, Elo and Kyngäs (2008) recommend performing these steps: open coding, creating categories and abstraction. First, in the open coding phase, the collected material is evaluated and categories are identified (Elo and Kyngäs, 2008). In this study, all sustainability reports were analysed in the codification phase. Sustainable practices were identified and grouped into macro-categories. Subsequently, the researchers sought to classify each practice according to keywords that best represented their content (some practices could be described using more than one keyword). In order to understand the relationship between the keywords used to identify the practices, a graph was structured to analyse the semantic network using the software Gephi. Benites-Lazaro et al. (2018) highlight that it is a network analytical tool that links nodes (keywords) and edges (relationships), enabling data analysis.

The next step to be taken is abstraction. It requires elaborate categories to describe research themes (Elo and Kyngäs, 2008). For this research, we used the targets of SGDs 7, 9, 11 and 12 as categories as explained in the introduction section. Next, we related these targets with each practice previously selected. O&G industry may contribute to all SDGs, whether reducing adverse effects or increasing their positive contributions (IPIECA, IFC and UNDP, 2017). Despite that, for this analysis, we choose SDGs 7, 9, 11 and 12. The authors selected these goals because they are strongly related to the oil and gas industry. The targets were considered viable to analyse, and no similar studies were identified in the literature.

SDG 7: focuses on issues related to energy systems and, in this context, much of the debate about the use of fossil fuels and their impact on climate change (Halkos and Gkampoura, 2020).

SDG 9: industry typically can make essential contributions related to innovation and this issue is an essential feature in achieving sustainable development in the O&G sector (Dmitrieva and Romasheva, 2020).

SDG 11: considering that more than half the world's population lives in urban areas, and cities are responsible for 80% of the world's energy consumption, the debate on changing energy use patterns should involve O&G companies (IPIECA, IFC and UNDP, 2017).

SDG 12: O&G industry is concerned with impact mitigation and efficiency improvements in products, processes, and operations due to their capacity for environmental damage, such as in the air, water, and land (Inkpen and Ramaswamy, 2018; IPIECA, IFC and UNDP, 2017).

These 4 SDGs together have a total of 34 targets. Although, the analyses selected the 23 targets (Table 2) considered relevant to the oil and gas industry according to IPIECA, IFC and UNDP (2017). By mapping these linkages, IPIECA, IFC and UNDP (2017) aim to stimulate these companies to further incorporate relevant SDGs into their operations and business.

It should be emphasised that the contributions of the practices identified in the aforementioned targets were also analysed in terms of companies. The last step was characterised by analysing the results obtained and establishing conclusions.

4. Results

Most sustainability reports follow the GRI structure (85% of reports). Regarding the period for which companies are publishing sustainability reports, the average period is 11 years, ranging from 6 to 15 years amongst analysed companies. Another important issue in the reports concerns a third-party external verification, which is present in 85% of companies.

The inductive analysis that was initially conducted made it possible to identify 244 sustainable practices reported by companies in their sustainability reports. Each practice was classified according to keywords that best represented their content, as shown in Fig. 2, noting that a sustainable practice can be associated with more than one keyword according to its scope. The definition used by the authors of this article for each keyword (20 keywords were used in total) is presented in Table 3. It is possible to observe that the keywords that stood out the most were social (15%), environment (12%), wastes (11%), R&D (7%) and the 3Rs (reduce, reuse, and recycle) (7%).

The relationship between the keywords used to classify the practices was analysed using a graph built in the Gephi software. The result can be seen in Fig. 3. The size of the circle reflects the total number of practices related to a keyword and the thickness of the connections reflects the strength of the link between two keywords.

Continuing, Fig. 4 presents the percentage of sustainable practices - amongst the 244 identified - that relate with each of the targets of SDGs 7, 9, 11 and 12. Again, it is worth remembering that a practice could be related to more than one SDG targets.

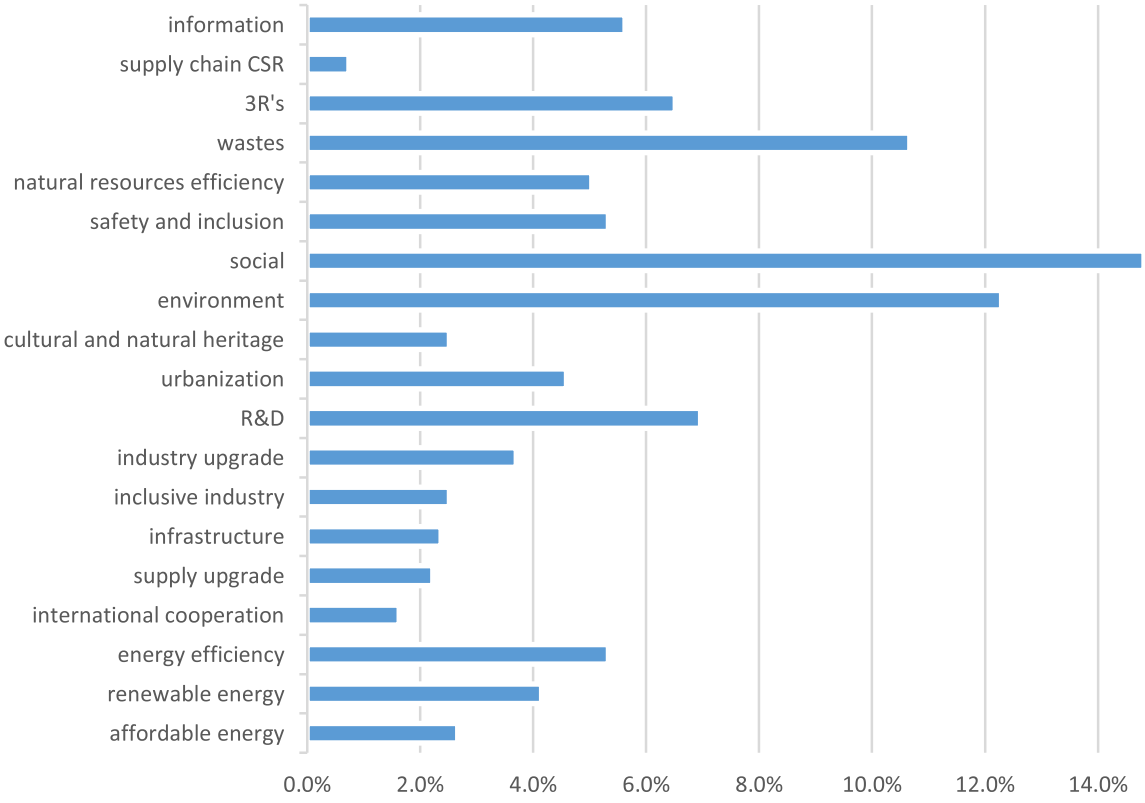

Fig. 2. Keywords used to classify the 244 sustainable initiatives (Source: Authors).

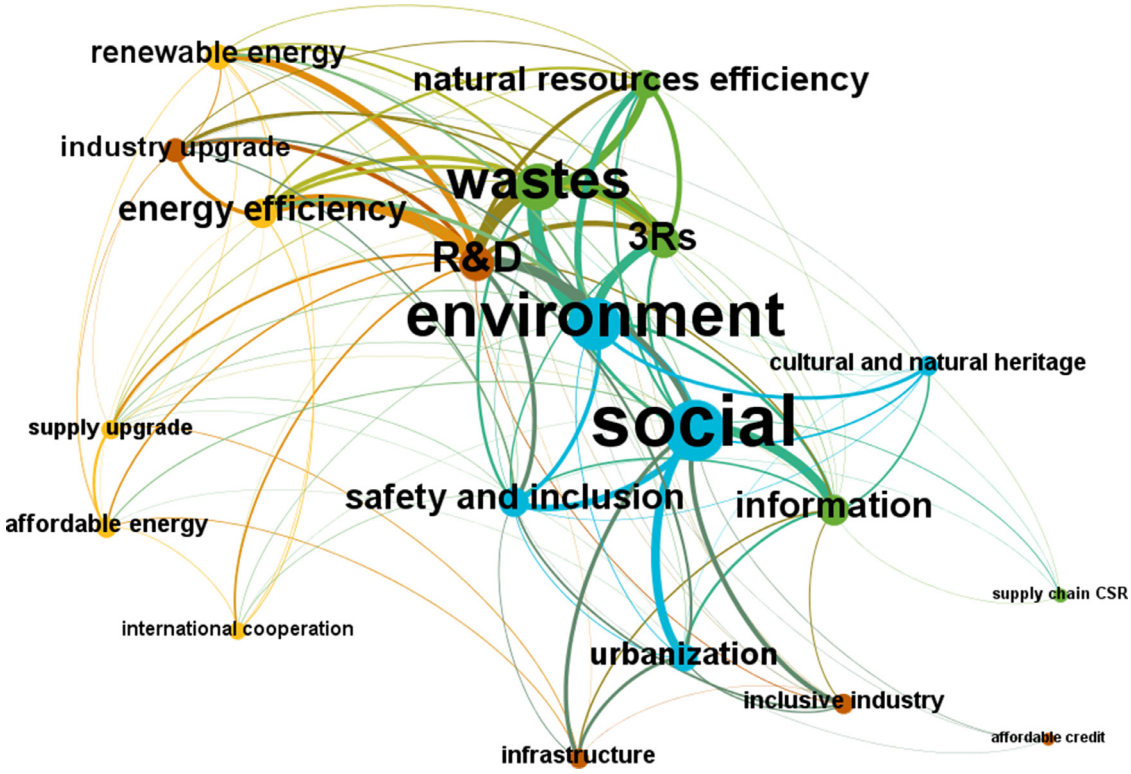

Fig. 3. Graph showing the power relationship between the keywords used to represent the sustainable initiatives of Latin American O&G companies (Source: Authors based on research data).

Table 2
Targets related to SDGs 7, 9,11 and 12 relevant to the O&G industry (Source: (IPIECA, IFC and UNDP, 2017; UN, 2015)).

Sustainable Development Goals	Targets
Goal 7: "Ensure access to affordable, reliable, sustainable and modern energy for all"	7.1 "By 2030, ensure universal access to affordable, reliable and modern energy services" 7.2 "By 2030, increase substantially the share of renewable energy in the global energy mix" 7.3 "By 2030, double the global rate of improvement in energy efficiency" 7.a "By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology" 7.b "By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support"
Goal 9: "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"	9.1 "Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all" 9.2 "Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries" 9.3 "Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets" 9.4 "By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities" 9.5 "Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending" 9.b "Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities"
Goal 11. "Make cities and human settlements inclusive, safe, resilient and sustainable"	11.3 "By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries" 11.4 "Strengthen efforts to protect and safeguard the world's cultural and natural heritage" 11.6 "By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management" 11.a "Support positive economic, social and environmental links between urban, per-urban and rural areas by strengthening national and regional development planning" 11.b "By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels"
Goal 12. "Ensure sustainable consumption and production patterns"	12.2 "By 2030, achieve the sustainable management and efficient use of natural resources" 12.4 "By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment" 12.5 "By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse" 12.6 "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle" 12.8 "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature" 12.a "Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production" 12.c "Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities"

It is possible to notice in Fig. 4 that the main contribution of the Latin American oil and gas industry, in its total conception, is towards target 11.a (13%), followed by target 11.6 (11%) and target 12.4 (9%). Relatively fewer efforts are devoted to areas related to targets 9.3 (0%), 12.6 (1%) and 12.c (0%), which refer to increasing access by small industries and other companies to financial services, especially in developing countries (target 9.3), stimulating organisations to consider sustainability practices in their activities and inform these practices in their reports (target 12.6), and reduce inefficient fossil fuel subsidies use (target 12.c).

It is also interesting to conduct an analysis by companies. Fig. 5 shows the number of practices reported in sustainability reports by each company linked to each of the targets, remembering that a practice may be linked to more than one target. Table 4, in turn, indicates the average number of targets that each practice of each company correlates.

5. Discussion

The authors of this article agree with Borges et al. (2017) and Rosati and Faria (2019) that most companies use the GRI standard to disclose their sustainable practices in order to facilitate society's access to information and provide greater credibility to the data presented. For Chiba et al. (2018), credibility can be understood as perceived reliability regarding transparency and monitoring mechanisms adopted. In this sense, the GRI standard guides companies through principles focusing on improvements in sustainability reports quality, aligning concepts of credibility, transparency and quality of the information presented.

The average period of the publication of sustainability reports by the studied companies is 11 years, with at least six years and at most 15 years of publication. In line with these deadlines, the systematic review of the literature prepared by Latapí et al. (2019) showed the lack of publications focusing on CSR in the energy sector between 1990 and 2007, although CSR literature exists since 1950. Notably, the number of publications has increased considerably in the period from 2007 to 2018. This indicates a strong relationship between the literature focused on CSR in the energy sector and the publication of sustainability reports by O&G companies in Latin America, suggesting that the academic debate in the sustainability field may exert social pressure that contributes

Table 3
Content of keywords used to group sustainable initiatives (Source: Authors).

Keywords	Content of keyword related initiatives
affordable energy	guarantee of supply, logistics, price, distribution, marketing, mobility, access to energy, new wells, new pipelines, transport
renewable energy	renewable, cleaner fuel, wind, solar, geothermal, alternative energy
energy efficiency	process optimization, loss reduction, emission reduction, automation, efficiency, reuse of oily waste streams, exchange of experiences and good practices, reuse of waste gases, product improvement
international cooperation	cooperation, partnership, alliances, covenants
supply upgrade	improvements in transportation, transfers, storage, distribution security, logistics, investments in distribution and service, new pipelines
infrastructure	security in facilities, expansion and modernization of facilities, mitigation of social and operational risks, investment in public and community infrastructure
inclusive industry	job offers, diversity and inclusion, local labour, prevention of slave labour, professional training projects, jobs for vulnerable groups, treatments for malformation, business development
affordable credit	remuneration for cooperatives, financial support for startups
industry upgrade	optimization and digitalization of processes, investments in IT, projects to reduce emissions, improve productivity, automation, new technologies, expansion and modernization of facilities, security, and reliability of facilities
urbanization	community service, improvement of medical and sanitary aspects, care for children and adolescents, professional qualification, inclusion, school reform, urban mobility, electricity, water, gas and heating, social works, cleaning efforts, city planning more sustainable, public and community infrastructure, public services
cultural and natural heritage	archaeological rescue, biodiversity conservation, reforestation, cultural strengthening
environment	nature, recovery and conservation of forests, reduction of emissions, reduction of waste generation, environmental education, animal protection projects, correct waste disposal, reuse of waste, recycling, water savings, social and environmental investment, cleaning efforts, treatment of soil
Social	social, socio-environmental, socio-economic projects, community, subsidies, theft prevention, accident prevention, diversity actions, inclusion, training, donations, investment in education and health, quality of life, more sustainable facilities, waste reduction and recycling campaigns, encouraging cooperation in transport, incentive programs for good practices, human rights, social works, public services, access to water and sanitation
safety and inclusion	safety of facilities, inclusion
natural resources efficiency	research for resource optimization, reduction of sulfur content, anti-waste culture in the use of non-renewable natural resources, water resource management, fuel development, reuse, reduction, recycling
Wastes	waste disposal, cleaning efforts, reuse, reduction, recycling, emission reduction, water resources management, product management
3Rs	reuse, reduction, recycling
supply chain CSR	event for partners, suppliers, customers and employees, improvement plans for providers
information	information, education, forums, projects, events, workshops
R&D	prototypes, technology, research, innovation
fossil-fuel subsidies	–

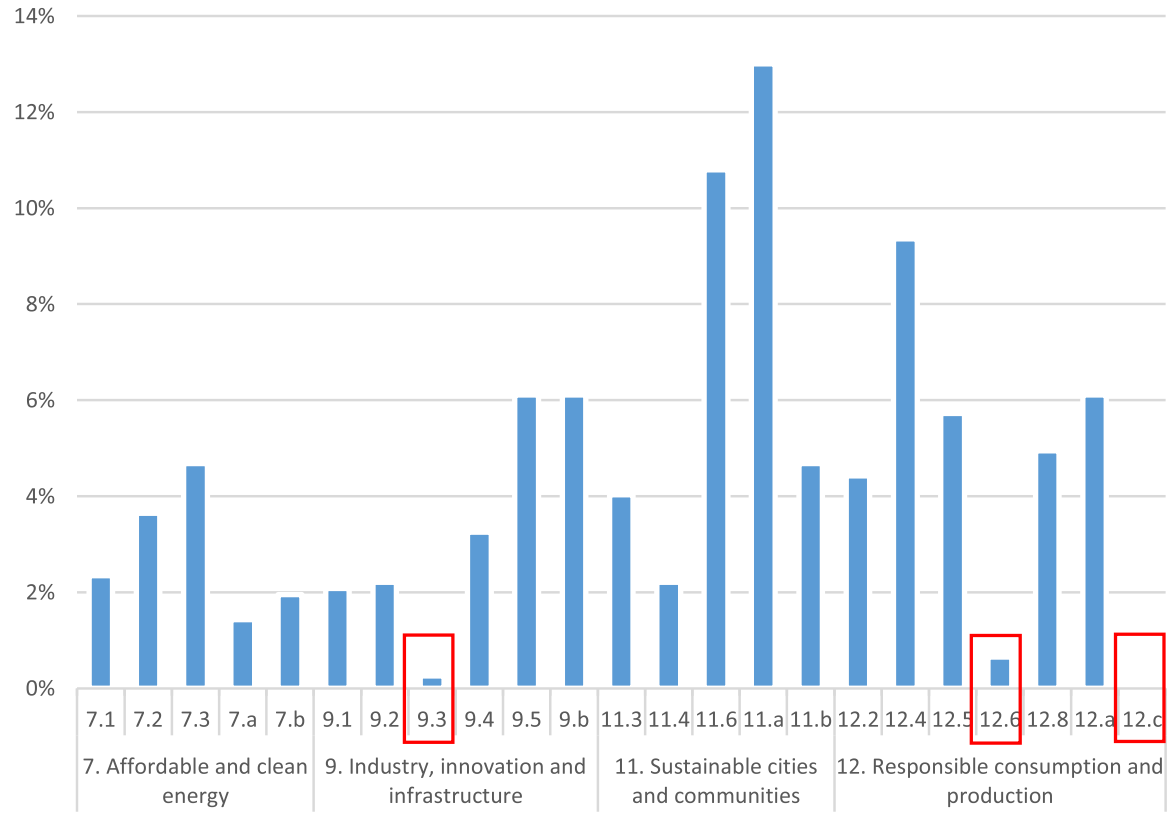

Fig. 4. Correlation of the sustainable initiatives identified with the targets of SDGs 7, 9, 11 and 12 - percentage values (Source: Authors from the analysed sustainability reports).

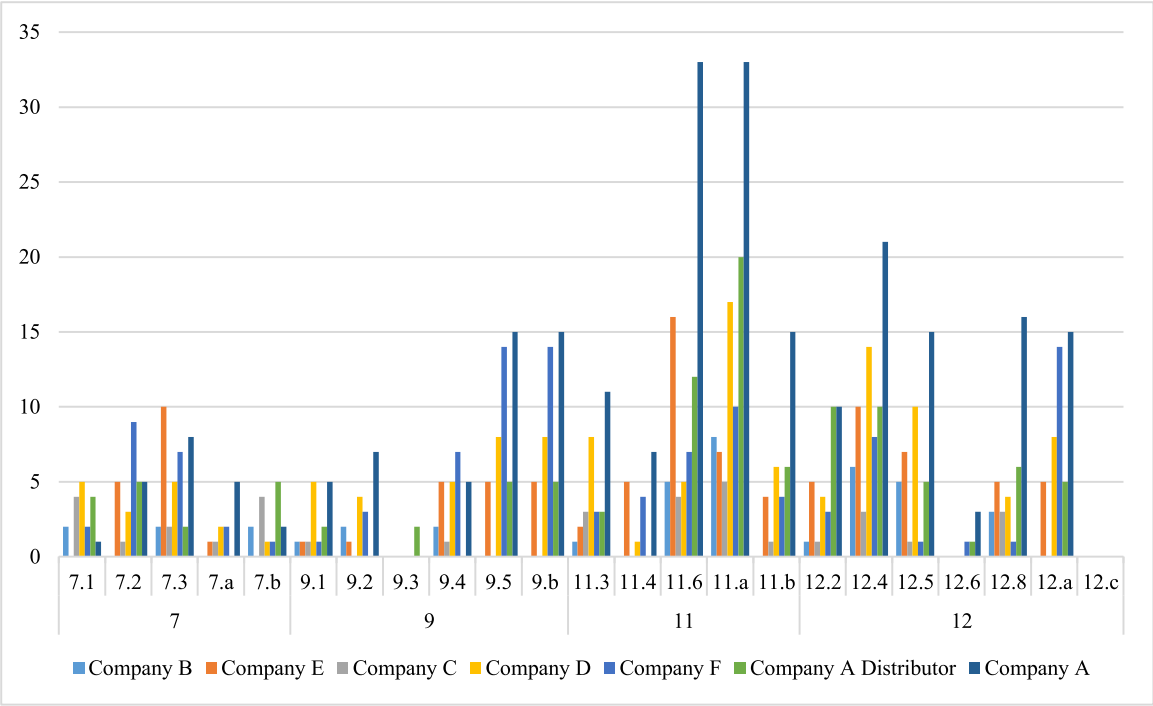

Fig. 5. Correlation of the sustainable initiatives identified by companies with the targets of SDGs 7, 9, 11 and 12 - values in percentage (Source: Authors from the analysed sustainability reports).

Table 4
Average number of targets that each initiative of each company correlates (Source: Authors from the analysed sustainability reports).

Companies	Each initiative relates on average to...
Company A	3.92 targets of SDGs 7, 11, 9 and 12.
Company B	2.67 targets of SDGs 7, 11, 9 and 12.
Company C	2.69 targets of SDGs 7, 11, 9 and 12.
Company D	2.67 targets of SDGs 7, 11, 9 and 12.
Company E	3.09 targets of SDGs 7, 11, 9 and 12.
Company F	2.83 targets of SDGs 7, 11, 9 and 12.
Company A Distributor	3.18 targets of SDGs 7, 11, 9 and 12.

to the adoption of responsive CSR attitudes by companies, such as the dissemination of sustainability reports.

There is third party external verification in 85% of the sustainability reports, which shows that companies use the verification processes to ensure the reliability of a report, and consolidate the corporate commitment to sustainability and transparency, in line with Borges et al. (2017). Moses et al. (2020) mentioned that part of the literature has documented the simple fact that although companies engage in sustainability reporting practices, it is not a guarantee that stakeholders requirements and expectations will be met. The authors emphasise that independent third-party verification is an important step for ensuring reports quality.

In presenting the results, it became evident that social and environment were the keywords that stood out the most in the practices of O&G companies in Latin America. According to Hák et al. (2016), concerns about sustainability started focusing on environmental aspects. The authors highlight that in the World Summit on Social Development, in 1995, social aspects of sustainability were emphasised. In the "World Summit on Sustainable Development", in 2002, these aspects were endorsed. In line with the evolution of this concept understanding, Arena et al. (2018) emphasise the increasing relevance of social and environmental aspects.

From the presented graph, it is possible to analyse the associations between the keywords used to identify the practices. Notably, in the graph, there is a strong relationship between the keyword wastes and the words environment, R&D and 3Rs (reuse, reduce and recycle), demonstrating the intention of O&G companies in Latin America to properly manage chemicals and wastes in their entire life cycle, including disposal of wastes aiming to minimise negative impacts on people and environment (IPIECA, IFC and UNDP, 2017).

Still about the strength of the relationship, the association between the keyword's energy efficiency and R&D is perceived as relevant. It is known that hydrocarbons extraction and transformation consume a lot of energy. The amount of energy consumed by the O&G industry requires changes in the sector. For this, research and development are necessary. In this sense, investments are required to enhance the energy efficiency, expand the use of energy from renewable sources and increase carbon capture and storage processes implementation (IPIECA, IFC and UNDP, 2017).

Moratis and Melissen (2019) argue that the SDGs present objectives characterised by exchanges and mutual benefits. Therefore, the 17 SDGs (and their targets) are present strong relationships with each other. However, Wang et al. (2019) state that companies present difficulties to recognise these relationships; consequently, they integrate those targets better connected with their strategies for sustainability; thus, the SDGs end up not being fully integrated into the business. That said, it becomes worrying to identify only a few practices related to the keywords supply chain CSR (1%) and affordable credit (0%), associated with targets 12.6 and 9.3, respectively, and no practice related to the keyword fossil-fuel subsidies (0%) associated with target 12.c in the reports analysed. Considering that this gap was observed in all the companies analysed, the authors of this article believe that there is a lack of prioritisation of the targets understood as less aligned to the oil and gas sector.

As declared by Wang et al. (2019), the non-observance of the interconnection between the targets can hinder the achievement of larger objectives. For example, we can mention the keyword wastes (associated with target 12.4), which correlated with 11% of the listed practices in the analysed reports and are responsible for composing the largest clus-

ter of the map of the relationships between keywords. Therefore, it is possible to assume that this word can be considered a core target for LA's O&G companies. However, IPIECA et al. (2017) argue that the non-elimination of fossil fuel subsidies in some producing countries, a topic not addressed in the evaluated reports, encourages waste and discourages the growth of low-carbon alternatives, going against the efforts of existing practices.

Rahdari et al. (2016) explain that companies need to properly understand the SDGs to develop a mature sustainability model aligned with their scope of operation. However, as presented by Stafford-Smith et al. (2017), the focus on specific SDGs carries the risk of 'selective choice' by companies, in which SDGs that generate fast benefits as the outcome are prioritised in relation to those that generate less immediate results. amongst the evaluated companies, it is observed that Company A stands out from the others, having practices that on average encompass a higher number of SDGs 7, 9, 11 and 12 targets, making possible the effective implementation of a sustainable practice that contributes to the achievement of several targets. This demonstrates greater alignment with the Triple Bottom Line (TBL) concept, which discusses the need to consider social, environmental, and economic aspects integrated for sustainability policies. Barata et al. (2014) state that organisations must consider these dimensions of sustainability to be truly responsible in their activities and decisions.

6. Policy implications

The importance of each SDG to a company depends on a number of variables, including the public policies governing the company's activities (IPIECA, IFC and UNDP, 2017). As declared by Panwar et al. (2014) and Benites-Lazaro and Mello-Théry (2017), in general, sustainable practices developed by Latin America companies do not follow any regulation from the governments and companies can, at any time, abandon or reduce social and environmental initiatives due to problems such as financial crises. In this sense, Latin America national and local governments may see opportunities to link relevant laws and policies, regulatory activity, and funding specially to the targets 9.3 (access to financial services), 12.6 (adopt sustainable practices and inform them in their reports) and 12.c (reduce fossil fuel subsidies), which have few practices reported by LA's O&G companies were related to them.

Governments have the primary responsibility to establish an enabling environment for building accountable and inclusive institutions and governance mechanisms and developing national plans to achieve the SDGs. They also draft, implement and enforce the policies, legislation and regulations governing society, including the oil and gas industry (IPIECA, IFC and UNDP, 2017).

Successful implementation of the SDGs in the O&G sector will require unprecedented cooperation and collaboration amongst governments, the private sector, communities, development agencies and other stakeholders (IPIECA, IFC and UNDP, 2017). This approach is beneficial to O&G sector and their stakeholders and facilitate addressing issues related to the lack of a transparent implementation approach to the SDGs. Working together helps to achieve consensus, develop good practices, and set regulatory standards.

7. Conclusions and final considerations

The main objective of this study was to analyse the sustainable practices developed by the main oil and gas companies in Latin America and correlate them with the targets of SDGs 7, 9, 11 and 12. Based on the findings presented, it can be verified that this goal is achieved.

As the main conclusions of this study, it can be seen that the vast majority of the practices reported in sustainability reports are related to social and environmental issues, and considering the targets of the SDGs mentioned above, the following are underemphasised: targets 9.3 (access to financial services), 12.6 (adopt sustainable practices and inform them in their reports) and 12.c (reduce fossil fuel subsidies). Considering the key role of the analysed companies, improvements in these targets are vital for the O&G sector to active the goals of 2030 Agenda.

The main limitation of this study is the use of published sustainability reports. The content analysis was performed based on their data. However, it should be highlighted that most of the analysed companies follow GRI guidelines and present robust reports with rich information to be evaluated. The quality and credibility of the information acquired through sustainability reports are an option for further research.

Despite its exploratory character, these findings are of great value for researchers interested in the topic and debates on how the oil and gas sector in Latin America can evolve in corporate social responsibility. As a future study, the authors also suggest developing the Delphi technique with specialists in the area and in Corporate Social Responsibility to discuss how such companies can contribute to targets 9.3, 12.6, and 12.c.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

Anholon, R., Quelhas, O.L.G., Leal Filho, W., de Souza Pinto, J., Feher, A., 2016. Assessing corporate social responsibility concepts used by a Brazilian manufacturer of airplanes: a case study at Embraer. J. Clean. Prod. 135, 740–749 Elsevier Ltd.

Arena, M., Azzone, G., Mapelli, F., 2018. What drives the evolution of Corporate Social Responsibility strategies? An institutional logics perspective. J. Clean. Prod. 171, 345–355 Elsevier Ltd.

Asif, M., Searcy, C., Zutshi, A., Fisscher, O.A.M., 2013. An integrated management systems approach to corporate social responsibility. J. Clean. Prod. 56, 7–17 Elsevier Ltd.

Barata, J.F.F., Quelhas, O.L.G., Costa, H.G., Gutierrez, R.H., Lameira, V., de, J., Meiriño, M.J., 2014. Multi-criteria indicator for sustainability rating in suppliers of the oil and gas industries in Brazil. Sustainability 6 (3), 1107–1128 (Switzerland).

Benites-Lazaro, L.L., Giatti, L., Giarolla, A., 2018. Sustainability and governance of sugarcane ethanol companies in Brazil: topic modeling analysis of CSR reporting. J. Clean. Prod. 197, 583–591 Elsevier Ltd.

Benites-Lazaro, L.L., Mello-Théry, N.A., 2017. CSR as a legitimatizing tool in carbon market: evidence from Latin America's Clean Development Mechanism. J. Clean. Prod. 149, 218–226.

Berkowitz, H., Bucheli, M., Dumez, H., 2016. Collectively designing CSR through meta-organizations: a case study of the oil and gas industry. J. Bus. Ethics 143 (4), 753–769.

Boiral, O., Heras-Saizarbitoria, I., 2019. Sustainability reporting assurance: creating stakeholder accountability through hyperreality? J. Clean. Prod. 243, 1–17.

Borges, M.L., Anholon, R., Cooper Ordoñez, R.E., Quelhas, O.L.G., Santa-Eulalia, L.A., Leal Filho, W., 2017. Corporate Social Responsibility (CSR) practices developed by Brazilian companies: an exploratory study. Int. J. Sustain. Dev. World Ecol. 25 (6), 509–517 Taylor & Francis.

Castro, G.D.R., Fernández, M.C.G., Colsa, Á.U., 2021. Unleashing the convergence amid digitalization and sustainability towards pursuing the Sustainable Development Goals (SDGs): a holistic review. J. Clean. Prod. 280. doi:10.1016/j.jclepro.2020.122204, available at:.

Chiba, S., Talbot, D., Boiral, O., 2018. Sustainability adrift: an evaluation of the credibility of sustainability information disclosed by public organizations. Acc. Forum 42 (4), 328–340 Elsevier.

Chowdhury, R.H., Choi, S., Ennis, S., Chung, D, 2019. Which dimension of corporate social responsibility is a value driver in the oil and gas industry? Can. J. Adm. Sci. 36 (2), 260–272.

Correa-Garcia, J.A., Garcia-Benau, M.A., Garcia-Meca, E., 2020. Corporate governance and its implications for sustainability reporting quality in Latin American business groups. J. Clean. Prod. 260, 121142 Elsevier Ltd.

Dmitrieva, D., Romasheva, N., 2020. Sustainable development of oil and gas potential of the arctic and its shelf zone: the role of innovations. J. Mar. Sci. Eng. 8 (12), 1–18.

Du, S., Vieira, E.T., 2012. Striving for legitimacy through corporate social responsibility: insights from oil companies. J. Bus. Ethics 110 (4), 413–427.

Elo, S., Kyngäs, H., 2008. The qualitative content analysis process. J. Adv. Nurs. 62 (1), 107–115.

George, R.A., Siti-Nabiha, A.K., Jalaludin, D., Abdalla, Y.A., 2016. Barriers to and enablers of sustainability integration in the performance management systems of an oil and gas company. J. Clean. Prod. 136, 197–212 Elsevier Ltd.

GRI. (2021a), “About GRI”, available at: https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-portuguese-translations/(Accessed 23 June 2021).
GRI. (2021b), “GRI Standards”, available at: https://www.globalreporting.org/about-gri/ (Accessed 23 June 2021).
Hák, T., Janoušková, S., Moldan, B., 2016. Sustainable development goals: a need for relevant indicators. Ecol. Indic. 60, 565–573.
Halkos, G.E., Gkampoura, E.C., 2020. Reviewing usage, potentials, and limitations of renewable energy sources. Energies 13 (11), 2906.
Inkpen, A., Ramaswamy, K., 2018. State-owned multinationals and drivers of sustainability practices: an exploratory study of national oil companies. Adv. Strateg. Manag. 38, 95–117.
IPIECA, IFC and UNDP. (2017), “Mapping the oil and gas industry to the sustainable development goals: an atlas”, p. 112.
Latapí Agudelo, M.A., Johannsdottir, L., Davidsdottir, B., 2019. Drivers that motivate energy companies to be responsible. A systematic literature review of Corporate Social Responsibility in the energy sector. J. Clean. Prod. 247. doi:10.1016/j.jclepro.2019.119094, available at:.
Lázaro, L.L.B., Gremaud, A.P., 2016. A responsabilidade social empresarial e sustentabilidade na América Latina: Brasil e México. Rev. Adm. UFSM 9 (1), 138–155.
Mahmoudian, F., Nazari, J.A. and Herremans, I.M. (2020), “Sustainability control system components, reporting and performance”, Corporate Governance: The International Journal of Business in Society, Vol. ahead-of-p No. ahead-of-print, available at: 10.1108/CG-06-2020-0208.
Malaquias, R.F., Borges Junior, D.M., Malaquias, F.F.de O., Albertin, A.L., 2019. Climate protection or corporate promotion? Energy companies, development, and sustainability reports in Latin America. Energy Res. Soc. Sci. 54, 150–156 ElsevierMarch.
Mendes, A.P.A., Teixeira, C.A.N., Rocio, M.A.R. and D’Oliveira, L.A.S. (2017), “Panoramas Setoriais 2030: Petróleo e Gás”, pp. 93–105.
Moraes, D.M., Silva, P.H., Rampasso, I.S., Anholon, R., Quelhas, O.L.G., Farias Filho, J.R., Toledo, R.F., 2021. Environmentally-responsible corporate: actions analysis of Latin American pulp and paper industry. Environ. Chall. 4, 100153.
Moratis, L., Melissen, F., 2019. How do the sustainable development goals question rather than inform corporate sustainability? Resour. Conserv. Recycl. 141, 253–254 ElsevierNovember 2018.
Moses, E., Che-Ahmad, A., Abdulmalik, S.O., 2020. Board governance mechanisms and sustainability reporting quality: a theoretical framework. Cogent Business and Management, Cogent 7 (1). doi:10.1080/23311975.2020.1771075, available at:.
Our World in Data. (2019), “Energy- More than 80% of Our Energy Still Comes from Fossil Fuels”.
Panwar, R., Paul, K., Nybakk, E., Hansen, E., Thompson, D, 2014. The legitimacy of CSR actions of publicly traded companies versus family-owned companies. J. Bus. Ethics 125 (3), 481–496.
Polit, D.F., Beck, C.T., 2004. Nursing Research. Principles and Methods. Lippincott Williams & Wilkins, Philadelphia.
Pozas, M.del C.S., Lindsay, N.M., du Monceau, M.I., 2015. Corporate social responsibility and extractives industries in Latin America and the Caribbean: perspectives from the ground. Extr. Ind. Soc. 2 (1), 93–103.
Rahdari, A., Sepasi, S., Moradi, M., 2016. Achieving sustainability through Schumpeterian social entrepreneurship: the role of social enterprises. J. Clean. Prod. 137, 347–360 Elsevier Ltd.
Rosati, F., Faria, L.G.D., 2019. Addressing the SDGs in sustainability reports: the relationship with institutional factors. J. Clean. Prod. 215, 1312–1326 Elsevier Ltd.
Stafford-Smith, M., Griggs, D., Gaffney, O., Ullah, F., Reyers, B., Kanie, N., Stigson, B., et al., 2017. Integration: the key to implementing the Sustainable development goals. Sustain. Sci. 12 (6), 911–919 Springer.
Statista. (2019), “Leading national oil corporations based on sales revenue in Latin America in 2018″.
UN. (2015), “Transforming our world: the 2030 Agenda for Sustainable Development”.
Wang, X., Yuen, K.F., Wong, Y.D., Li, K.X., 2019. How can the maritime industry meet Sustainable Development Goals? An analysis of sustainability reports from the social entrepreneurship perspective. Transp. Res. Part D Transp. Environ. 78, 102173 ElsevierDecember 2019.
World Bank. (2017), State of electricity access report 2017, state of electricity access report 2017, available at: 10.1596/26646.