Using Text Data to Examine the Role of the Energy Sector Contribution to CSR.

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ABSTRACT

Sustainability is a thread that all successful energy companies must keep up with in the 21st century. The impetus for companies to pursue policies and practices that address social and environmental concerns has never been so strong, and corporate social responsibility in the energy sector is a critical differentiator between the industry pre- and post-crisis. The paper used text data to examine the role of the energy sector and its contribution to CSR. The paper revealed that all text data extracted from pdfs throw more light on the critical issues of CSR, but stakeholders in energy sector concentrated more on greenhouse gas emissions (GE) and employee health and safety (EHS), with less emphasis on customer welfare (CD) and diversity (D). Again, significant contributors to CSR are firms centred within the OECD territories compared to firms from African countries classified as LDC.

1.0 INTRODUCTION

The energy demand is increasing, both in developed and in developing countries. Energy plays a significant role as it drives economies and sustains societies. However, the energy industry is also a major source of air and water pollution and one of the world's largest emitters of greenhouse gases. Due to the impact and risk associated with the energy sector operations, such entities must contribute to CSR (Mapelli et al., 2016). Yoon et al. (2022) investigated the effect of company size and cause proximity on consumer response to CSR initiatives; concluded that company size does matter to CSR engagement. Also, the works of Godos-Díez et al. (2020) shed light by combining theories related to external and internal drivers of CSR, which concluded that firm size positively affects CSR formalisation and that this effect is more robust in the case of adopting a diversification strategy, while no evidence found for the moderating effect of internationalisation strategy. Finally, the paper discusses the new paradigm regarding the energy sector and the use of text data to examine its contribution towards CSR.

1.1 Research Question

1. Does the size of the firm influence CSR? 2. What are the trends among the critical factors of CSR? 3. Which countries address critical issues in CSR?

2.0 METHODOLOGY

The primary objective is to demonstrate to regulators how energy companies are tackling the four main CSR issues (greenhouse gas emissions, diversity, employee health and safety, and customer welfare) over time and with varying levels of importance. The aim is to provide insight into how these issues have been addressed by the firms and how they are being carried out. Furthermore, the chapter takes into consideration data sources and data collection procedures.

2.1 Data Source

The data comprises various firms across the globe that file their CSR to GRI from a period of 1999 to 2018.

2.2 Data Collection Procedures

Step 1 The missmap function was used to select columns from the energy sector, which contain a minimum of 80% of the data compared to the other columns. These columns include information on the name, size, country, country status, organization type, date added, publication year, listed and non-listed status, region, and type from the GRI dataset. Additionally, the required packages for text mining, visualization and importing/exporting data frames from/to Excel have been installed and loaded.

Step 2 The GRI dataset was used to filter the initial energy data frame, which includes the "energy" and "energy utilities" sectors. A new column was added to the data frame called "filename," which includes the "Name_", "publication year," and ".pdf" to match the CSR files from the energy folder that correspond to the energy sector. All duplicate files were also eliminated at this stage.

Step 3 A loop was executed to extract individual words and count them from all the energy sector files, and the results were stored in a data frame. Then keywords are categorized based on critical CSR issues into 10 different languages (English, German, French, Swedish, Spanish, Japanese, Greek, Portuguese, Russian, and Chinese), which accounted for 92.6% of the selected pdf files. Keywords that matched with the critical issues were extracted from the data frame and grouped by filename and key issue. The resulting data frame was then merged with the one created in step 2 using a common

column called "filename." Finally, a column was added to the merged data frame that contains the total count of critical CSR issues (GE, EHS, CW, D). This merged data frame is the final dataset.

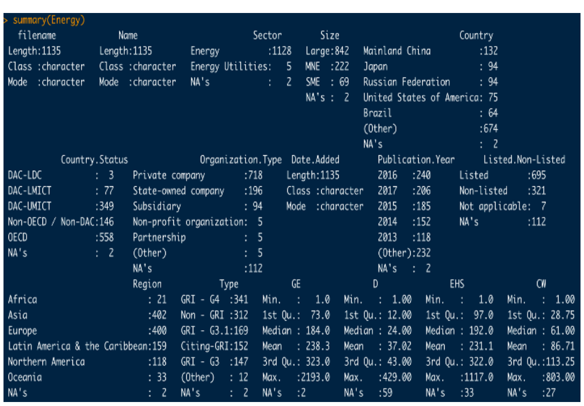
This method was used because it allowed for a thorough examination of the frequency of specific keywords related to the four main CSR issues, which could provide valuable insights into how firms are addressing these issues.

3.0 RESULT AND DISCUSSION

3.1 Descriptive Analysis

Per Figure 1, the total CSR report file to GRI constitutes 1,135 per the energy sector. Again, the data displays relevant information on firm size and country-specific such as the sector, status, organisation, and the year of publication of the CSR report.

Figure 1



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> summary(Energy)
  filename             Name                       Sector         Size                          Country
 Length:1135        Length:1135        Energy           :1128   Large:842   Mainland China          :132
 Class :character   Class :character   Energy Utilities:   5   MNE  :222   Japan                   : 94
 Mode  :character   Mode  :character   NA's            :   2   SME  : 69   Russian Federation      : 94
                                                               NA's :  2   United States of America: 75
                                                                           Brazil                  : 64
                                                                           (Other)                 :674
                                                                           NA's                    :  2
            Country.Status                Organization.Type  Date.Added          Publication.Year      Listed.Non-Listed
 DAC-LDC             :  3   Private company         :718    Length:1135        2016    :240     Listed         :695
 DAC-LMICT           : 77   State-owned company     :196    Class :character   2017    :206     Non-listed     :321
 DAC-UMICT           :349   Subsidiary              : 94    Mode  :character   2015    :185     Not applicable:  7
 Non-OECD / Non-DAC:146   Non-profit organization:  5                       2014    :152     NA's           :112
 OECD                :558   Partnership             :  5                       2013    :118
 NA's                :  2   (Other)                 :  5                       (Other):232
                            NA's                    :112                       NA's   :  2
                            Region            Type             GE                D                EHS               CW
 Africa                         : 21   GRI - G4  :341   Min.   :   1.0   Min.   :  1.00   Min.   :   1.0   Min.   :  1.00
 Asia                           :402   Non - GRI :312   1st Qu.:  73.0   1st Qu.: 12.00   1st Qu.:  97.0   1st Qu.: 28.75
 Europe                         :400   GRI - G3.1:169   Median : 184.0   Median : 24.00   Median : 192.0   Median : 61.00
 Latin America & the Caribbean:159   Citing-GRI:152   Mean   : 238.3   Mean   : 37.02   Mean   : 231.1   Mean   : 86.71
 Northern America               :118   GRI - G3  :147   3rd Qu.: 323.0   3rd Qu.: 43.00   3rd Qu.: 322.0   3rd Qu.:113.25
 Oceania                        : 33   (Other)   : 12   Max.   :2193.0   Max.   :429.00   Max.   :1117.0   Max.   :803.00
 NA's                           :  2   NA's      :  2   NA's   :2        NA's   :59       NA's   :33       NA's   :27
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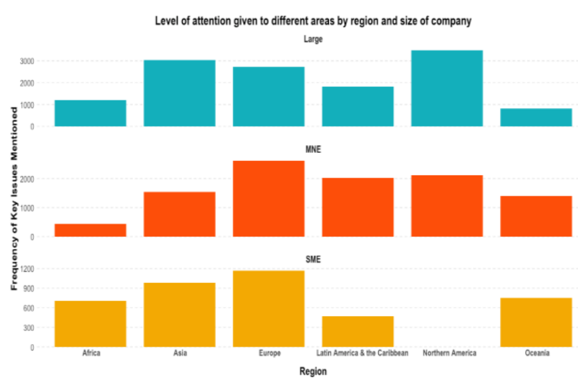
3.2 Answers to Research Questions

Research question 1 tends to address how firm size influences CSR. Per figure 2, large firms contributed more as compared to other sectors. Per country, large firms in North America contributed more (above 3000). Also, there is a constant contribution from firms in Asia and Europe compared to less from firms in Africa and Oceania. It confirms Yoon et al. (2022) that firm size does matter regarding their contribution to CSR.

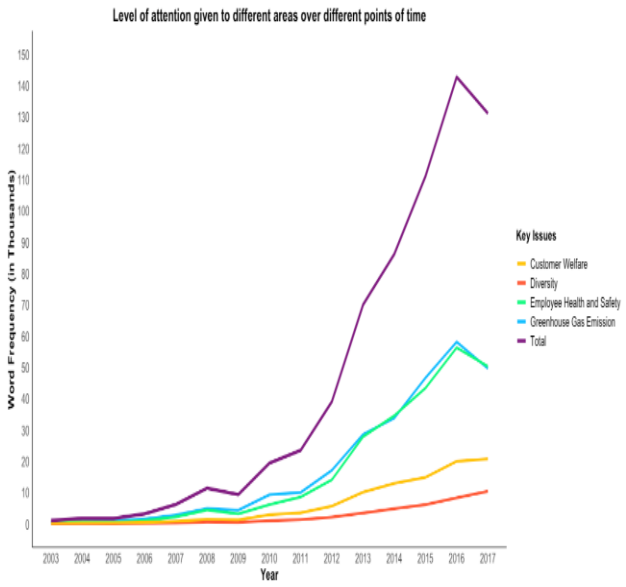
Figure 2



Research question 2 tends to address the trends among the critical factors of CSR, thus including greenhouse gas emissions (GE), diversity(D), employee health and safety (EHS) and customer welfare (CW). Per figure 3, stakeholders are more interested in solving GE-related issues than other factors (EHS, D, CW). The reason is that GE has become a global pandemic and needs a holistic solution approach. For 2016, both EHS and GE showed approximated growth

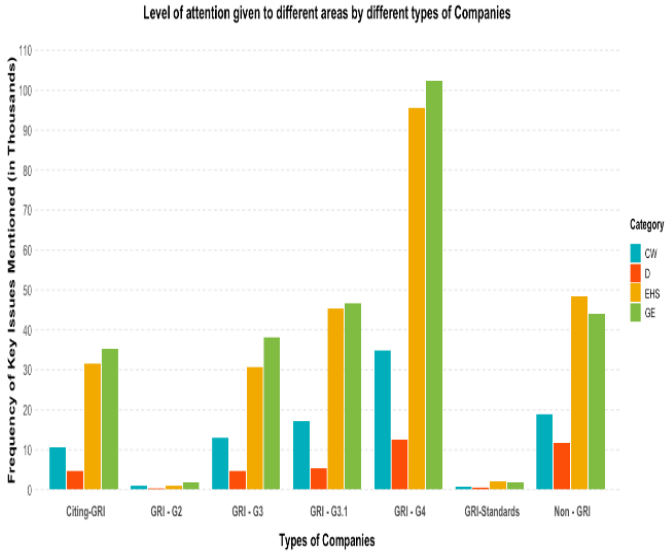
of 60 and 55, respectively. Comparatively, D and CW did not show impressive growth and fell within 5 and 20 across the years. The downfall trends in D and CW are due to demand and supply changes from the external market, which firms cannot control. It confirms Mapelli et al. (2016), who argue that the risk associated with the energy sector operation is enormous, regardless of their economic benefit and need to contribute more regarding CSR; hence, deduce that more policies from the stakeholders are towards solving GE issues.

Figure 3



Research question 3 tends to find out how countries address critical issues of CSR. The analysis is explained in sub-sections. Per figure 4, more companies file returns during G4. The reasons involve realising the risk operations associated with the energy sector and the need to contribute more towards CSR. Again, there is consistent growth in files sent to GRI between G3, G3.1, Non - GRI and Citing GRI. The less contribution to GRI was in the G2 and GRI -standards period.

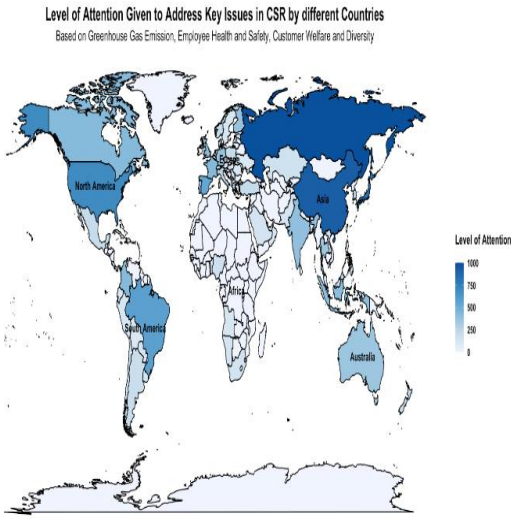
Figure 4



Per figure 5, countries such as Asia, Europe, and America (North and South) contribute more towards CSR, which falls within the range of 500 to 1000. The reason is that more firms centred in these countries are highly required by law to contribute to CSR due to their operations. On the contrary, African countries have less contribution since they fall within the range of 0 and 250 per the legends. To argue, only some firms are in African countries, coupled with a need for

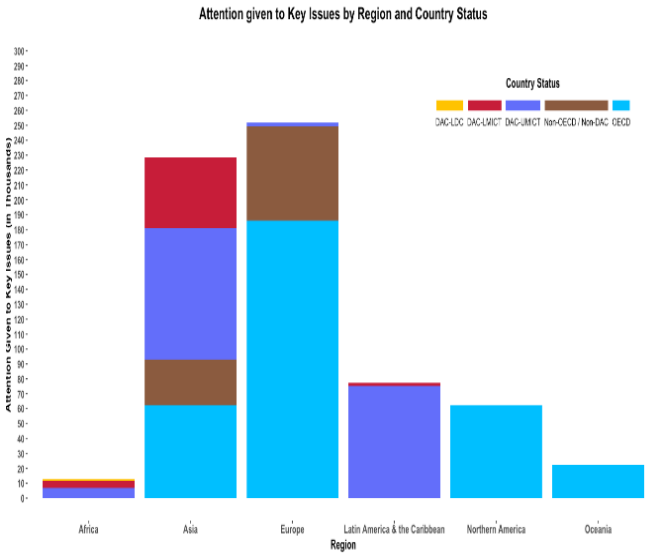
more knowledge on the importance of contributing to CSR regardless of damages caused by such firms.

Figure 5



Per figure 6, countries within the OECD (Europe, America, Asia) dominate regarding giving priority to CSR. Again, such countries are classified as upper-middle countries and territories (UMCT) with leverage on industrialisation due to technological advancement. On the other hand, African countries fall within less developed countries (LDC), accounting for less industrialisation, and using primitive methods in production affects contribution to CSR. The diversification in CSR confirms Godos-Díez et al. (2020) shed light on the issues of combining theories related to external and internal drivers of CSR depending on a diversification strategy to achieve total satisfaction.

Figure 6



CONCLUSION

As the energy demand continues to grow, energy companies must prioritise sustainability, environmental stewardship, and social responsibility to repay for damages from their operations. Furthermore, more companies from the MNEs and SMEs should be encouraged to contribute more to CSR since they were less productive than large firms within the study period. Lastly, the energy sector stakeholders must contribute equally to all the critical factors of CSR since there was an inadequate contribution to addressing Customer welfare (CW) and diversity(D).

References

Godos-Díez,J.-L., Cabeza-García, L., Martínez-Campillo, A & Fernández-Gago, R. (2020). The Importance of Firm Size and Development Strategies for CSR Formalisation. *New Research in Strategy and International Business* (*Emerald Studies in Global Strategic Responsiveness*), Emerald Publishing Limited, Bingley, pp. 107-131. https://doi.org/10.1108/978-1-83982-476-020200006.

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