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Sustaining oil and gas multinational operations through corporate social responsibility practices

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Received: 24 May 2021 / Accepted: 7 June 2021
Published online: 04 August 2021

Abstract
The objective of this study is to provide empirical evidence from the perspective of prudent corporate social responsibility practices by oil and gas multinationals in emerging economies on how investments in and disclosure of the practices could enhance financial sustainability. Accounting-based measures on investments, financial performance, disclosures of activities and panel data set on company size (total assets) over a 10-year period (t) were analysed. Findings show that multinationals with interests in emerging economies take key aspects of their corporate social responsibility practices seriously. There was a significant positive relationship ($p=0.0035 < 0.05$) between investments in corporate social responsibility practices and sustainability of financial performance. No significant relationship ($p=0.4409 > 0.05$) was established between disclosure and financial performance. The paper concludes, by supporting the preposition with scientific data, that functional corporate social responsibility practices yield sustained dividend by presenting a stronger financial outlook for multinational oil and gas companies who engage in it. This is prudent for poverty alleviation initiatives and key to achieving the sustainable development goals and targets in emerging economies where they operate.

Keywords Sustainability · Oil and gas multinationals · Corporate social responsibility practices · Emerging economies · Industry performance

1 Introduction and background to the study

The oil and gas industry is seen to assert its operations towards business ethics that subscribes for the tenets of sustainability. Key amongst the evolving code of practices the industry is paying particular attention to include stakeholder rights, environmental protection, product stewardship, financial transparency, corruption, community relations and corporate social responsibility (CSR) [1–3]. Per the Global reporting initiative (GRI) and the United Nations' Global Compact Report [4], oil and gas multinationals have demonstrated active leadership roles in developing good corporate business practices and codes of conduct in their work environment, leveraging different sectors of environment and society, where they have interest. The participation of ChevronTexaco, Exxon-Mobil, Shell, BP-Amoco, ENI, Occidental, Tullow and Total-Fina-Elf, all with interests and investments in emerging economies [4], attest to this. Their activities can be

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s43621-021-00042-x.

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seen clearly, especially in Africa, as key off-takers of labour, transfer of foreign direct investment (FDI) and agents of skills and technology transfer [4]. These companies account for a large share of state revenues in the economies where their operations persist [5, 6]. Thus, development interventions through programmes in education, health, commerce, energy, agriculture, transport, and infrastructure by oil and gas companies in many emerging countries cannot be ignored [7–10].

Although one would have assumed that the 'Acts of God' which is presumed to drive oil and gas companies to act socially responsible are bone out of mere benevolence to society [11], affirms that these multinationals engage in super-normal profitable ventures with disregard to environmental damage, and use CSR as cover-ups for their evil deeds. The stakeholder theory confirms the former assertion as it notes that functional CSR is expected to boost a company's external image and leverage its exceptional comparative marketing prawns' merits among the increasing socially conscious stakeholders and consumers. The end result is to be seen leading to sustained revenue generation of multinationals in the long run [12]. There is also compelling evidence to suggest that multinationals could gain financially and in kind from CSR activities [13–16]. Whilst some promoters of CSR argue favourably for the business profitability case, another school of thought is of the view that oil and gas multinationals, neck-deep in CSR activities, may eventually depart from their main mandate of operating environmentally friendly oil and gas business and rather use CSR (economic gains) as a mere superficial window-dressing [13, 17, 18] to cover up environmental degradation and sociatal neglect. Ample evidence, however, abounds to suggest that Tullow Oil Public Limited Company (PLC), as a multinational company, has made some significant investments in education and local content development to empower local businesses in Ghana and Uganda [13, 19–22]. In Angola, Chevron Texaco and British Petroleum (BP) multinational giants have committed significant resources in the development of education and in combating the acquired immune deficiency syndrome (AIDS) whilst Eni, Shell, Chevron Texaco, Total and Petro China have made significantly impact on Nigeria's gross domestic product (GDP) growth trajectories [23, 24]. These multinationals in Nigeria also run a number of community development programmes in education, health, agriculture and transportation [19–21, 25]. BP-Amoco and Shell have leveraged South Africa's economy in terms of capital and technology transfer, market provision for their exports and supply of imports. PETRONAS, ExxonMobil and Eni have been the revenue backbone to Chad, Gabon, Sudan and South Sudan, Gabon, Algeria and Libya's economies. In the same vein Elf and ExxonMobil have contributed immensely as sources of revenue, major employment off-taker and a strong GDP contributor to the growth of Congo and Equatorial Guinea's economies [20, 25, 26].

The underlying question this study seeks to peruse is, what is it that motivates oil and gas multinationals to invest so much resources in CSR that needs to be disclosed? The goal of this study is to adduce empirical evidence from the perspective of CSR activities and practices of multinationals in emerging economies. The aim is to ascertain how investments in and disclosure of CSR practices influence financial performance of their operations in emerging economies using accounting-based methods. Specifically, the study identified and examined CSR practices of oil and gas multinationals and assessed the relationship between CSR disclosure practices and sustainable financial performance of the multinationals with investments in Africa. To achieve these objectives, three key compelling questions are raised to elicit responses deemed relevant based on the preposition of the study:—(i) What are these CSR practices and activities of the multinationals; (ii) How does CSR disclosure practices influence financial performance; and (iii) In what ways will investments in CSR enhance sustainability in financial performance? Apart from immensely contributing to ging bridging literature gap in CSR activities, this study is expected to enhance understanding of relationships between investments in CSR practices, disclosures and financial sustainability of oil and gas multinational companies' operations. Furthermore, the outcome of this study will be useful for managers and decision makers to develop transparent social performance policies that may lead to the sustainability of oil and gas multinational operations.

2 Is corporate social responsibility (CSR) relevant?

With turn of the millennium, the concept of CSR has generated a lot of headlines, and is seen as one, with which companies are keen on integrating social and environmental concerns into their business operations and frequent interactions with their stakeholders on voluntary basis [27]. To explain the main idea behind this [28], argue that CSR activities tend to reflects both the social imperatives and consequences of business success. The responsibility however lies within the preview of the firm to implement and direct responsibilities which would be determined, to a great extent by the discretion of the business's financial performance. Per this assertion, the mandatory aspect of CSR is invoked and that businesses have direct responsibility towards engaging society to solve problems [29, 30]. In recent times, CSR has been interpreted by another school of thought as one that embraces the triple bottom-line concept; people, planet and profit

(PPP) [29–31]. This conception widens the scope of CSR to include a range of criteria useful for measuring the success of an economic entity investing in CSR activities. Thus, beyond oil and gas multinationals maximizing supernormal profits, they are better placed to play critical roles in engaging communities within their jurisdiction of operations to solve societal problems of which poverty alleviation is key. It is also seen as a differentiation strategy by firms that may have positive effect on value creation for their establishments and benefits for clients. It has the ultimate potential to improve on the firms' own financial performance in the long run [32, 33].

2.1 Theoretical concepts

This study has its underpinnings in the CSR instrumental theory (IT) which focus on firms achieving their economic goals through social interventions [34, 35]. The goal, according to the proponents, is to maximize shareholders' value in the long term, position social investment in the context of competition. They see oil and gas multinationals' dynamic capabilities in the exploitation of natural resources (hydrocarbons) as altruistic and a cause-related marketing tool [34, 35]. This may help to explain why another school of thought see investments in CSR and disclosure of same with the expectation to improve the financial performance of companies [36, 37]. Why multinationals undertake CSR activities, the types of investments they engage in and what is considered as social responsibility (respect for the environment, human and labour rights), may as well, according to [38], be founded on both ethical and integrative theoretical domains of CSR. Ethical theories lay the foundation and entreat firms to do the right thing for the good of society based on universal rights and the common good. According to [34, 35], it must also take into consideration fiduciary duties to stakeholders of the business (labour rights, human rights, and respect for the environment). The goal is to achieve human development with consideration of the present and future generations to benefit same. This integrative perspective builds on a firm's public responsibility, management issues, management of stakeholders and a firm's corporate social performance to respond to how businesses react to political and social issues, existing policy process and law for social performance. This will ensure a balance between the interest of a business-stakeholder relationship, searching for social legitimacy and ways to give the right response to social issues.

Within the enlightened shareholder (ES) approach, there is also emerging evidence to suggest that firms could gain financially and in kinds from CSR activities [13, 15]. In this regard, oil and gas multinationals need to consider a wide range of social and environmental matters if they are to maximize long-term financial returns [39]. Critics of CSR, however, have argued on the contrary that firms' spending monies on CSR activities may be distracted from their fundamental economic mandate and see such ventures as mere superficial window-dressing [38, 39]. They posit that once CSR is not priced, strict compliance expected to have the same rate of returns may be bedevilled with the risk of cost of equity capital [39, 40]. To buttress this argument, another school of thought [41, 42], have argued that pricing of CSR issues cannot be given only on theoretical grounds. This paper shares in this reasoning and agrees with the proponents that it will ultimately depend on investors' perception of the relevance of the CSR's goals and principles in the end.

2.2 Corporate social responsibility disclosure and financial performance

The legitimacy theory (LT) of CSR is the foundation of firms disclosing their CSR activities [43]. Oil and gas multinationals are expected to operate in an environment with the implied notion of a social pact on which survival of the companies will thrive [44]. Their legitimacy to operate in the society is signalled by them to engage in and make significant disclosure of their CSR activities. According to [44], it also has the potential to serve as a channel for the multinationals to advertise themselves, instil competition, ensure sustainability and maintain a good public image. In other words, CSR disclosures enable firms to avoid adverse selection risks, access the capital markets and gain support of the community and their customers through awareness of products and services promotion [45, 46]. In all of these oil and gas multinationals with presence in emerging economies, especially Africa, have demonstrated their potentials.

2.3 Measuring corporate social responsibility and sustainability of financial outlook

According to [1, 5, 47, 48], measuring the relationship between CSR and corporate financial performance can be achieved using either the accounting or market-based methods, each with its own strength and challenges. Whereas [1, 37, 47] choose to perform such measurement using the return on Assets (ROA) ratio, the return on equity (ROE), return on sales (ROS), return on investments (ROI) and profit margin (PM) financial ratios [48–50] could also be used to measure the profitability of different companies in establishing a relationship between CSR, financial performance (FP) and firm size.

According to [38, 51], these measures help to provide a reflection of the internal efficiency of a company's operations. Accounting measures are widely employed due to the ease of calculation and understanding of method., Operationalization of this measure is based on historical figures of performance and may however be subject to bias through managerial influence and certain differences in accounting procedures [41, 51, 52].

With the market-based measure, the firm's share performance is used to determine the relationship between CSR and Corporate financial performance. A study by [53–55] evaluated the stock market performance of socially responsible firms by considering a combination of aggregate buy-and-hold portfolios and individual stocks did not find any significant advantage from their CSR in relation to corporate financial performance. In another study, researchers did comparisons between movements in the share price of socially responsible multinational establishments [53, 56, 57] and non-socially responsible ones based on CSR impact. Results did indicate positive share price movements for multinationals that employ effective and credible stakeholder management [55, 56]. It can be concluded that market-based measures have the advantage of being less susceptible to managerial influences [1, 47, 54]. Again, this method has the advantage of been used to evaluate perceptions of a company's future performance as opposed to historical events. Stock performance may thus be clear indication of how investors view the operations of a company [55–57] into the future.

2.4 Disclosure of CSR activities and reporting

Comparative analysis of CSR activity disclosures among different types of industries may differ. Very low levels of CSR reporting activities are however recorded in emerging economies [25]. Disclosure levels of listed companies in Nigeria [43] and Ghana's brewery [58] industries were generally low. According to a survey by [21], disclosure of CSR activities by firms increased worldwide from 50% in 2005 to 95% in 2011.It has since become one of the benchmarks for ensuring sustainability in the extractive industry. Most of the firms reporting on CSR were found within the multinational oil and gas industry and attributed largely to pressure on need for environmental sustainability and high expectations of stakeholders [20, 21] to breakeven. However, in spite of the soaring popularity CSR reporting by firms is gaining, it is not clear to determine empirically whether oil and gas multinationals' CSR performance data are under or over reported since only few companies have their reports externally verified [20–22]. There is also little evidence on the effect of CSR disclosure on corporate financial performance, especially in emerging economies. This gap gives premise for further justification for need of this study to be pursued on the topic under investigation.

3 Methods and context

This study used the mixed qualitative and quantitative research method. Qualitative data on CSR activities of oil and gas multinationals with strong presence in emerging economies were analysed to understand their CSR practices through inductive analysis [59]. Quantitative data on CSR investments and financial performance of 9 multinational Oil and gas companies with presence in Africa was used to test the hypothesis that investing in CSR leads to improved financial performance [55, 56]. This approach is expected to provide clear understanding of the research problem on how CSR behaviour of oil and gas multinationals with presence in Africa influence financial performance sustainability [60, 61]. Descriptively, the study explored and explained the effects of investments in CSR and disclosures on their corporate financial performance through secondary data and examined relationships and correlations between the study variables. Multiple sources of secondary data on multinationals' CSR activities and practices were utilized [19, 23, 24, 57, 62] to offer comparative analysis and contextual setting on how CSR disclosures influence financial performance of firms in developing countries. Out of 17 oil and gas multinationals with strong presence in Africa (Appendix A), 9 were purposively sampled (Appendix B) based on data availability spanning 2010–2020 [23, 24]. Information on CSR investments and disclosures, financial performance and sustainability indicators published in audited financial statement, sustainability and annual reports were synthesised into a 10-year panel dataset to run and test a behavioural model, based on [55, 56]. The regression model is stated below as,

$$\mathrm{YP}_{xt} = \alpha_0 + \alpha_1 \mathrm{CSRIV}_{xt} + \alpha_2 \mathrm{CSRDC}_{xt} + \alpha_3 \mathrm{TAST}_{xt} + \varepsilon_{xt}$$

where YP_{xt} is oil and gas multinational company x's financial outlook (dependent variable) at time t, determined as turnin on assets [17]. CSRIV_{xt} depict oil and gas multinational company x's CSR investments at time t, and CSRDC_{xt} connotes oil and gas multinational company x's CSR disclosures at time t. The intrinsic variables for the model are CSRIV_{xt}

Table 1 Oil and gas multinationals core CSR practices and activities assessment criteria

Core CSR practices	Assessment criteria
1. Commitment to CSR activities	Based on how oil and gas multinational companies integrate CSR into their business model and their committed pledges and agendas for CSR practices
2. Environmental aspects	Assessment is based on how oil and gas multinational companies manage environmental issues related to their core business in the areas of energy consumptions and emissions, climate change, biodiversity, water quality and depletion, waste, noise, dust, recycling
3. CSR spending	Measures spending and reported-financial commitments towards CSR and monies spent by oil and gas multinational companies on CSR activities
4. Work environment	Assessment is based on commitment made by oil and gas multinational companies to their employees in terms of health and safety, human rights, training and development, equal opportunity, diversity, work-life balance, training and development, remuneration and benefits, child labour issues
5. Market environment	Measures the economic and social impacts of the company's products and services, how the business leverages CSR activities to promote its business (reputation, competitive advantage) as wells as relationship with third party entities [64]
6. The Community	Measures CSR activities that are focused on the communities in which oil and gas multinational companies operate and stakeholder relations
7. CSR reporting	Assessment of CSR reporting is based on the frequency to which oil and gas multinational companies report CSR activities and made available to the public through both print and electronic media

Table 2 CSR benchmarked assessment scale

0–1	1–2	2–3	3–4	4–5
Does not highlight activities	To a low extent	To some extent	To a high extent	To a very high extent

and $CSRDC_{xt}$ [18]. The natural log of actual spending on CSR activities disclosed in previous annual reports were analysed to regress the firms' current year's financial performance to reflect their true effect on the operations [19]. It is deduced from [14, 15, 20] that the effect of current CSR investment is expected to show true reflections on the ensuing year's financial performance of the companies. In this model $CSRDC_{xt}$ is used as a dummy variable and assigned the value '1' if company 'x' vividly discloses CSR activities in its annual report [40, 41]. If otherwise, the company is given the value '0'. $TAST_{xt}$ is total asset of oil and gas multinational company x, determined as the natural logarithm of assets at period t [60]. To control variation in the dependent variable, this operationalization is deemed necessary [44, 59]. In the model the error for company x at time t is expressed as $\varepsilon_{tx,}$ the intercept as α_0 and coefficients for $CSRIV_{xt}$ and $CSRDC_{xt}$ (explanatory variables) of the companies, defined as, $\alpha_1 - \alpha_9$.

3.1 Data analysis

Statistical Package for Social Scientists (SPSS, 24th edition) was used to analyse the panel set of data. Using the multiple regression analysis model to assess the influence of CSR and CSR disclosure on financial sustainability, descriptive analysis was performed to determine the mean and standard deviation measures of the variables. To establish empirical relationship among the variables, the Pearson correlation analysis was performed, and also checked for multi collinearity disturbances among the independent variables [19, 60, 62]. The Wallace and Hussain estimator of component variances analysis was operationalized to test the hypotheses of the study. The panel data analysis is assumed to have merits over conventional cross-sectional or time-series data sets [62–64]. It also allows for larger data points (higher degrees of freedom) and reduces collinearity among explanatory variables and to test complicated behavioural models [55, 56, 60]. Content analysis was performed on the annual reports and other secondary information on oil and gas multinational companies, purposively sampled, to determine their CSR activities and practices [62]. Finally, based on [63–65], a sustainability benchmarking framework was adopted to assess CSR activities of the sampled companies in 7 core areas; Commitment to CSR, CSR spending, Community, environmental aspects, workplace environment, marketplace and CSR reporting. The core CSR areas of practice and assessment criteria are summarily depicted by Table 1.

The benchmark assessment was based on a likert scale of 1–5 [65, 66], where; 1: Does not highlight activities, 2: highlight activities to a low extent, 3: highlight activities to some extent, 4: highlight activities to a high extent, and 5: highlight activities to a very high extent (Table 2).

3.2 Ethical considerations

Due to extensive use of secondary data from oil and gas multinational companies which are published periodically and available to the public, no severe ethical issues are envisaged. Secondary data for the study was accessed from websites, annual reports and other publicly accessible publishing channels of multinational companies with investments in Africa [23, 24, 67]. However, in regard to ethical issues on legal access to books, articles and other documents, cited in-text, all have been duly acknowledged through in-text citations and referenced [58, 66] respectively in the study.

4 Results and discussions

4.1 Oil and gas multinational's CSR activities and practices

Table 3 depicts how oil and gas multinational companies with interest in Africa have behaved over the decade against the 7 benchmarked assessments. These are identified in the areas of; 1. Commitment, 2. Spending, 3. Community, 4. Environment, 5. Workplace, 6. Market place and 7. CSR reporting. Their pledges and agendas result on CSR are presented in Table 3. Based on [23, 24, 62, 63], the sustainability benchmarking framework was adopted to assess CSR activities and practices of multinationals in 7 core areas of engagement. Results show that all sampled oil and gas multinational companies with interest in emerging economies, especially Africa, are committed to CSR investments in all 7 identified core areas. To a large extent, data showed that they place very high emphasis on the environment (4*, Sum = 42) in which they operate (Tables 1, 3). Collectively, high priority was also given to other aspects of CSR; spending, the community, workplace, market place and reporting, with each scoring above a 30-score point (Table 3). The least CSR area of interest, however, was in the market place, which scored 31 points (6*, Sum = 31) out of 45. This may be due to historical antecedent of the oil and gas industry and sensitivity of their operations to the environment, communities where they operate and their workers. This outcome supports [39]'s assertion that one of the business entities that can make a strong claim to business ethics and or corporate socially responsible human rights, employee rights, stakeholder rights, environmental protection, community relations, transparency, environmental stewardship and sustainability principles is the oil and gas industry. [56, 59] also collaborates this and notes that oil and gas multinationals are active and play leadership roles in developing and promoting good corporate business practices and codes of conduct in the workplace as they engage with different facets of society in which they operate.

The CSR activities and practices of the multinational companies (Table 1) were scored, aggregated and ranked using the CSR benchmarked assessment scale (Table 2). The results shows that there was just one-point difference between

Table 3 Core CSR ratings of MOCs' activities and practices. Source: Based on field data, 2010–2020

Oil and gas company	Core CSR activities and practices rating							Cumulative aggregate score	Ranking
	1*	2*	3*	4*	5*	6*	7*		
Total	4	2	4	5	4	3	3	25	7th
Shell	4	4	4	5	4	4	4	29	2nd
Eni	4	4	4	5	4	3	4	28	3rd
ExxonMobil	4	5	4	5	4	4	4	30	1st
Tullow Oil	4	4	3	4	4	3	3	25	8th
BP	4	4	4	5	3	4	4	28	4th
Chevron	4	3	4	5	4	4	4	28	5th
Petronas	4	3	4	4	3	3	4	25	9th
Sinopec	4	5	4	4	3	3	5	28	6th
Sum	36	34	35	42	33	31	35		

1* = commitment, 2* = spending, 3* = community, 4* = environment, 5* = workplace, 6* = market place, 7* = CSR reporting

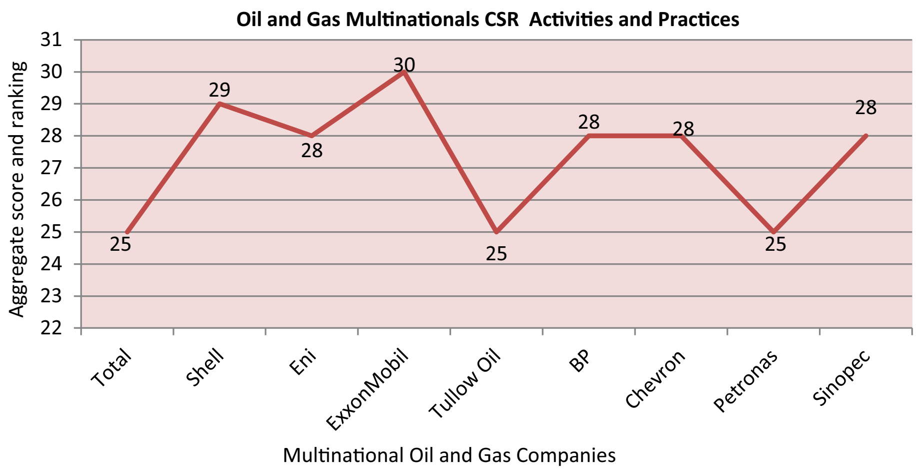

Fig. 1 Ranking of CSR activities and practices (Source: Based on field data, 2010–2020)

ExxonMobil and Shell on the aggregate scores (Table 3). ExxonMobil however ranked first (Fig. 1) on the scale as both companies, either registered 'to a high extent' (4 points) or 'to a very high extent' (5 points) in the CSR activities and practices appraisal as captured in their sustainability operations' documents [20–22].

Using the same benchmarking framework on a scale of 0–5 (1 = Does not highlight activities, 2 = To a low extent, 3 = To some Extent, 4 = To a high extent, 5 = To a very high extent), multinational companies Eni, BP, Chevron and Sinopec all scored 28 points (out of 35) in the CSR activity and practice performance of their operations. They were rated across the 6 identified core areas of assessment as depicted by Fig. 1. Based on assessment criteria, they ranked 3rd, 4th, 5th and 6th respectively (Table 3). Relatively, the least performed multinationals are Total, Tullow and Petronas (Fig. 1, Table 3), who came 7th, 8th and 9th respectively. This is an indication that these oil and gas companies need to appraise their investments in CSR activities and operations and refocus deployment of their resources.

4.2 Descriptive analysis

The mean score and standard deviation, together with kurtosis and skewness distributions are presented for the dependent and independent variables specified in the model. A left tail position is indicative of negatively skewed distribution and a right tail distribution signifies a positively skewed distribution. For kurtosis on the other hand, it can either be flatter peak or substantial peak distribution [62, 63, 67]. From the analysis (Table 4), YP has a mean score of 15.51, suggesting a healthy profitability margin across the sampled multinationals with interests in Africa. The variable has a right tailed skewness distribution with a flattened peak (Skewness = 0.16 and Kurtosis = 1.89). The mean score for CSRIV was 3.28, an indication of consistent CSR investment over the period by the oil and gas multinationals. The kurtosis for CSRIV indicates a substantial peak (Kurtosis = 5.97) with left-tailed negatively skewed distribution (Skewness = − 1.37). The mean score for CSRDC of 1.00 reflects disclose of CSR activities through consistent periodic reporting over the period (Table 4). This is expected to be progressive with improvement on the scope and quality of reporting from year to year by the

Table 4 Descriptive analysis of variables. Source: Based on field data, 2010–2020

Descriptive analysis	YP	CSRIV	CSRDC	TAST
Mean	15.51	3.28	1.00	6.13
Median	16.40	3.29	1.00	6.17
Maximum	28.10	3.41	1.00	6.40
Minimum	5.40	2.69	1.00	5.69
Std. Dev	7.51	0.13	0.00	0.22
Skewness	0.16	− 1.37	n/a	− 0.64
Kurtosis	1.89	5.97	n/a	2.39
Sum	1535.4	324.29	99	606.89
Sum Sq. Dev	5527.96	1.75	0.00	4.95
Observations	99	99	99	99

Table 5 Correlation and collinearity analysis. Source: Based on field data, 2010–2020

Correlation probability	TAST	CSRIV	CSRDC	YP
TAST	1.00 --------			
CSRIV	0.3929 0.0670	1.00 --------		
CSRDC	0.1509 0.1357	0.1988 0.0675	1.00 --------	
YP	−0.2788 0.0052	−0.2967 0.0029	−0.0889 0.3815	1.00 --------

Covariance analysis at 99 observations

Correlation is signiicant at the 0.01 level (2-tailed); Dependent Variable YP

multinationals [23, 24, 54, 57, 63].The mean value for TAST was 6.13, left-tailed skewed and negative (Skewness = −0.64), with flattened peak distribution (Kurtosis = 2.39).

To establish correlation among variables in the model and test for collinearity disturbance, the correlation matrix was computed (Table 5). Result from Table 5 indicate that CSR investment (CSRIV) and the size of multinationals (TAST) are correlated significantly with financial performance (YP), an indication of sustainability (p-value of 0.0052 and 0.0029 respectively). The relationship between YP and CSRIV, and YP and TAST are both negative ($r = -0.2967$ and $r = -0.2788$ respectively) as depicted by Table 5. Among the independent variables (TAST, CSRIV, CSRDC), however, there was no significant correlation, an indication that no multi-collinearity issues exist, and based on [67], the regression estimates are accepted to be accurate.

4.3 Effect of CSR and CSR disclosure on financial performance

The influence of CSR disclosure on financial performance was assessed using the model estimation analysis to provide empirical evidence of the effects of CSR investment and disclosure on the financial sustainability of oil and gas multinational companies operating in Africa. First, the study performed a test to determine whether investment in CSR activities has a positive or otherwise effect on financial performance. Second, it tested to see whether disclosure on such activities has significant effect on financial performance. The Wallace and Hussain estimator of component variances (a two-way fixed effects and random effects panel model) was operationalized at 0.05 significance level (Table 6). Based on [56, 57, 63], the Hausman specification test checked for efficiency and for which of the two options is appropriate to use (Given that if p > chi square > 0.05, random effect model is recommended, and if p < chi-square < 0.05, the fixed effects model is recommended). This also allowed for utilization of variation in the variables over the 10-year period to estimate the effects of CSR investment and disclosure (independent variables) on financial performance (dependent variable). From Table 6, the Hausman test did not show any correlation between the unobserved person specific random effects and the independent variables, ($p = 0.81423 > \alpha = 0.05$), therefore, the random effects model was accepted for the estimation of the panel data model.

The Wallace and Hussain panel analysis were operationalized to test the hypotheses of the study. Table 6 depicts analysis of the results.

From Table 7, the analysis show that CSR investments ($CSRIV_{xt}$) significantly predicts financial performance (YP) ($p = 0.0035 < 0.05$) with a positive relationship (coefficient = 0.602168 and t-statistics = 2.989764), an indication that, investment in CSR activities by multinationals with interests in emerging economies has a positive impact on their financial performance. However, the results indicate a non-significant positive relationship on the effect of CSR disclosure ($CSRDC_{xt}$) on financial performance (YP_{xt}) of the oil and gas companies ($p = 0.4409 > 0.05$). R^2 and adjusted R^2were estimated to assess strength of the predictions in the specified model (Table 7). The values suggest that the specified

Table 6 Hausman test-random and fixed effects

Test Summary	Chi. Sq. statistic	Chi. Sq. df	Probability
Cross-section random	1.434075	3	0.5284
Period random	0.000012	3	1.00000
Cross-section and Period random	0.876913	3	0.81423

Table 7 Component variances (Wallace and Hussain). Source: Based on field data, 2010–2020

Variable	Coefficient	Std. Error	t- statistic	Probability
CSRIV	0.602168	0.201410	2.989764	0.0035
CSRDC	2.613769	3.377568	0.773861	0.4409
TAST	−0.003990	0.010036	−0.397501	0.6919

Effects specification	SD	Rho
Cross-section random	0.007345	0.0416
Period random	0.006709	0.0651
Idiosyncratic random	0.031925	0.8671

Weighted statistics			
R-squared	0.231583	Mean dependent var	0.013257
Adjusted R-squared	0.206448	S.D. dependent Var	0.035212
S.E. of regression	0.045621	Durbin–Watson Statistic	1.897571
F-statistic	6.437681	………………	………………
Probability	0.000603	………………	………………

Dependent variable (YP): Method: Panel (Two-way random effects)

Period: 10; Cross sections included 9. Observations: 99

model significantly explains variations in the dependent variable (YP). To check for auto correlation among variables selected in the specified model, the Durbin–Watson Test was carried out. According to [61], upper limit for this test is a value of four and the lower limit is zero. A value of two means absence of autocorrelation and values less than or greater than two means the presence positive or negative autocorrelation among independent variables. The result for the Durbin–Watson test was 1.9, implying that the specified model for the analysis did not violate the independent residuals assumptions [60, 67–69] and there was no collinearity problem among the predictor variables.

5 Conclusions and recommendations

In conclusion, the analysis has shown that oil and gas multinational companies in emerging economies, especially, those with interest in Africa take all aspects of their CSR activities serious. They are seen to be at the forefront of CSR as they adhere and comply with international standards and best practices in the identified 7-benchmarkedcore areas area of CSR practices (Table 3). There is also indication from their reports that multinationals in the oil and gas industry continue to strive for improvement in CSR activities annually with positive impressions. This has registered significant improvements in their stakeholder relations and environmental impacts. Given the benefits associated with CSR best practices, pressure is mounting on multinational companies who did not do so well on the scale to adhere to global standards and best practices to boost investors' confidence.

The study has also shown that there is a significant positive relationship between investment in CSR and financial performance of multinational companies with interests in emerging economies. The positive influence of CSR on their financial performance of these firms could be deduced from due diligence and consistency attached to CSR practices over the 10-year period this study investigated. This has yielded dividend in terms of performance and financial sustainability. Investment in CSR also creates positive host community and stakeholder relations that allow multinational companies to concentrate on their core business of oil and gas production with the potential to increase output and improve financial performance for sustainability in the oil and gas industry. Since diligent and consistent investments in CSR can lead to improved financial performance leading to sustainability of businesses, the study recommends that oil and gas multinationals, especially those with investments in emerging economies, where most host communities are least developed, continue to invest in CSR so that the interventions can make significant impacts in the communities in which they operate. The model for assessing CSR influence on financial performance of oil and gas companies are mostly based on accounting measures; investments in CSR and CSR disclosures. For true reflection of performance, the study recommends future researches to broaden this measure to include other CSR areas such as the environment, the community, market place and workplace aspects. Also, the business performance measure of profitability can be expanded to include market-based performance measures. This enhanced model is expected to broaden understanding of the true effects of adopting good CSR practices by oil and gas multinational companies.

Authors' contributions ATG conceptualized, designed the draft proposal and collected data. EKN (corresponding author) critically analysed data and approved the proposal. EKN was also responsible for the revision, editing and final proof-reading of the manuscript. SS led the team in the design of data collection instruments. ATG, EKN, SS, JEY analysed and interpretated the results, and contributed to the final fine-tuning of the manuscript for submission to the Discover Sustainability Journal. All authors read and approved the final manuscript.

Declarations

Competing interests The authors declare no competing interests.

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