Impact of environmental disclosure on financial health of manufacturing firms

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Abstract Environmental reporting can help firms stay in compliance with environmental regulations and manage environmental risks. By proactively addressing and disclosing their environmental impact, manufacturing firms can mitigate potential legal and regulatory penalties, fines, and reputation damage, thereby safeguarding their financial performance. In addition to the latter perspective, cost savings and operational efficiency, enhanced reputation and stakeholder engagement, as well as access to capital and investment opportunities, are critical factors to ensure that firms disclose information about their environmental performance, including its impact on the environment, sustainability initiatives, and environmental risks and opportunities to ensure that they maximise their financial performance. Hence, the aim of this study is to explore the relationship between environmental reporting and financial performance of South African listed manufacturing firms. A multiple regression analysis was adopted to achieve the aim by testing the relationship between the variables amongst a sample of 50 manufacturing firms listed on the Johannesburg Stock Exchange (JSE). A content analysis was utilized to attain environmental reporting information themes from the integrated annual reports retrieved from the JSE for the period 2016 to 2020. The results indicate a negative association between environmental reporting responsibility and financial performance, measured by return on equity (ROE) when the components of environmental reporting are tested individually. However, when these components namely: environmental reporting, social reporting and environmental degradation are combined the findings reveal a positive and statistically significant relationship. These results imply that the adoption of environmental reporting, specifically an increase on the quality of environmental reporting results in an increase in the manufacturing firm performance.

Keywords: Environmental reporting, financial performance, sustainability reporting, manufacturing firms

1. Introduction

In the last few decades , there have been an emerging awareness towards the importance of environmental responsibility which prompted firms and other corporations to take a stand and address environmental issues (Deegan 2017). The act of disclosing non-financial information has predominantly become a useful tool used by many firms across the world to communicate their social and environmental relationship (Helfaya, Whittington and Alawattage 2019). It is further stated that the disclosure of such information is advantageous for firms as it contributes in portraying a good image in relation to effective environmental and social agenda, and it shows firm's commitment towards the environment of operation (Danso et al.

2019). Environmental and social information was initially demanded by the stakeholders of the republic, currently it is argued that such information is of the most important in terms of the decision making by both potential and existing investors(Clementino and Perkins 2021).Such information is presented in an annual integrated report which identifies pro-active and preventative measurements adopted by firms towards the environment and societies to lessen the negative impact. In this perspective , environmental and social reporting responsibility information caters for the needs of the vulnerable stakeholders and institutional investors . It has been quarrelled that even the agency-based theory regarding the additional information of both social and environment aspects would increase informational symmetry between principal and agents(Baird and Maruping 2021).At a recent time , the demand for corporate accountability in connection to social and environmental disclosure performance have been gaining a remarkable popularity amongst different stakeholders due to massive industrialisation , natural resources degradation , vandalization of ecosystem and overly used labour (Nishitani and Kokubu 2020).In response to the demands of the stakeholders, firms had to disclose the mitigating measures and practices taken in cleaning and preserving the environment by adopting environmental reporting that is attainable to every interested stakeholder (Tahajuddin et al. 2021).

Environmental reporting is a type of mechanism that emerges to factor in the environmental impacts of firms' operations. As investors and stakeholders put pressure on firms to disclose how their business activities impact on the environment and society, environmental reporting has been gaining popularity and importance across the world, all because of firms' undeniable impact to the environment. As such, various researchers have conducted studies in this domain, testing the relationship between environmental reporting and firm performance and firm value. However, their findings are contradicting one another, meaning that the argumentation is still on-going. Academic findings are either positive (Zhou, Simnett and Green 2017; Saini and Singhania 2019; Sharma, Bhattacharya and Thukral 2019; Agudelo, Johannsdottir and Davidsdottir 2020) or negative (Baboukardos and Rimmel 2016; Jeroe 2016),yet some authors found no link at all (Cortesi and Vena 2019) . Whilst some authors such as Agudelo, Johannsdottir and Davidsdottir (2020) hold that firms benefit from environmental accounting in terms of a good public image which attracts investors and improves their financial performance, These conflicting views have raised issues on whether firms benefit from environmental accounting. However, the perused previous South African papers in this study have focused on all the listed firms in South Africa, the findings of these studies might have been influenced by the nature of all listed companies. Meanwhile, certain firms such as financial

services, and technology firms, may have minimal or no direct carbon footprint or negative environmental impact. This might have affected the results of the prior studies, as such firms may still have a section on environmental impact in their integrated annual reports. The present study recognises the effect of manufacturing firms on the environment. In essence, a gap in extant knowledge is identified in this study. Hence the enthusiasm to investigate the impact of environmental reporting on the value of listed manufacturing firms in South Africa.

This study was conducted amongst South African manufacturing firms that are listed on the JSE. The firms listed on the JSE were selected because King Code IV requires all listed firms to publish annual integrated reporting, which is made available in the public domain and was attainable for this study. This makes South Africa the only country in Africa and amongst only a few in the world that mandates firms to provide such information. Quantitative research was adopted for this study. Environmental reports collected from a selected 50 manufacturing firms were analysed using statistical and econometric regression models. Additionally, an evaluation matrix was adopted where environmental responsibility reporting, environmental degradation reporting and social responsibility reporting were regarded as the components that were used to ensure validity of data collection, these components of environmental reporting were used as they are, there were no subtitles that fall under each component meaning that they were attended at a broader context. This gave the researcher the flexibility of including any relevant and useful information under each component respectively. Database such as McGregor BFA was also relied upon for financial performance data. Hence the main aim of this paper is to examine the relationship between environmental reporting and the profitability of manufacturing firms listed on the JSE.

2.Research Method

2.1. Data collection procedure and measurement of the Environmental reporting

This study adopted a quantitative research methodology. Data was gathered from the integrated annual reports of fifty (50) manufacturing firms listed on the South African JSE as of 2016-2020. The target population comprises only manufacturing firms solely involved in manufacturing activities. Moreover, these manufacturing firms were selected based on the availability of integrated annual reports from the JSE website. Selected firms were preferred based on the total assets of R 14 million. Manufacturing firms with a total value of less than R14 million were rejected. The environmental reports of manufacturing firms were coded in line with the developed Likert scale, analysed, and rated according to the information presented in alignment to the firms' environmental, social responsibility and environmental degradation activities. The annual integrated reports were examined through content analysis. All the retrieved integrated annual reports were reviewed based on the criteria of the evaluation matrix criteria.

2.2. Validity and Reliability

Various strategies were adopted to enhance the degree of reliability of data. This study relied on various documents containing relevant related evidence from published and accredited studies on environmental reporting. Additionally, a content analysis data collection and coding training was conducted by the researchers. During the coding process, the researchers constantly reviewed the work to ensure data validity. Furthermore, the integrated reporting evaluation matrix score was developed for the collection and analysis of data on environmental responsibility reporting, environmental degradation reporting and social responsibility reporting. This matrix was thoroughly and critically formulated to be in line and consistent with the evidence reviewed from prior studies and the content elements of the IRF and the Global Reporting Initiative

IV. The initial researcher coded all the 250 reports following all the developed evaluation matrix as guidelines, and the main author was consistent with the coding guidelines to ensure validity and reliability.

2.3. The Estimation Techniques and econometrics model

The current study developed a multiple regression analysis. Fixed effect and random effect estimation techniques was used to estimate the regression models. The relationship between environmental accounting and firm's performance was estimated using the value relevance model developed by Ohlson (1995). The following econometric model examines the impact of the individual components of environmental reporting on ROE.

$$ROE_{it} = \beta_0 + \beta_1 ERR_{it} + \beta_2 EDR_{it-1} + \beta_3 SRR_{it} + \beta_4 BVPS_{it} + \beta_5 EPS_{it-1} + \beta_6 Size_{it} + \beta_7 Age_{it} + \beta_8 Leverage_{it} + \varepsilon_{it}$$

The variables in the models include:

ROE_{it}: denotes the return on equity of firm i at time t. The ROE was measured by the percentage of profit after tax to total equity, which is made up of total capital contributed by shareholders of the firms, also taking into consideration all the accumulated profits over time and was obtained from the McGregor BFA database.

β_0 to β_8: Beta represents the variation of independent variables.

ERR_{it}: ERR denotes Environmental Responsibility Reporting of firm i at time t. Environmental reporting was all the information related to the relationship that South African JSE- listed manufacturing firms have with the environment and relevant scores were assigned to determine the quality and the weight of the information provided in integrated annual reports.

SRR_{it}: denotes the Social Responsibility Reporting of firm i at time t.

EDR_{it}: denotes Environmental Degradation Reporting of firm i at time t. EDR responsibility was all the information that relates to the report on pollution of the environment due to the business activities of manufacturing firms, altogether with the measurements taken to ease the impact on the environment for the benefit of both business and relevant stakeholders at the time.

$Size_{it}$: $Size_{it}$ denotes firm Size i at time t. In this study, the size of firms was determined by the natural logarithm of the manufacturing firms' total assets value, which is basically made up of the sum of current and non-current assets.

$Leverage_{it}$: This variable is the leverage of firm i at time t. Firms' leverage was measured by the percentage of total debt to shareholders' equity.

$BVPS_{it}$: BVPS represents the book value per share of firm i at time t.

EPS_{it-1}: EPS denotes the earnings per share of firm i at time t. The EPS was measured by the percentage of earnings after preference dividends to the total number of shares and was obtained from the McGregor BFA database.

A multicollinearity test was conducted to examine the level of collinearity amongst the independent variables using a Spearman correlation analysis. The results of the multicollinearity test indicated that no serious multicorrelation issues were present because the correlation coefficients amongst the independent variables were less than 0.70, which is regarded as the designated benchmark to measure the correlation amongst the independent variables (Cao, Hiyoshi and Montgomery 2020).

3.   The Impact of Environmental Reporting on Return on Equity

This section presents the results of the impact of environmental reporting on firms' ROE. Table 1 assesses the impact of the individual components of environmental reporting on firms'

ROE, whilst Table 2 estimates the impact of the combined score of environmental reporting on ROE. The results from the fixed effect model were interpreted based on the p-value (0.034) of the Hausman test.

Table 1: The Impact of Environmental Reporting on ROE

ROE	Random Effect			Fixed Effects		
Variables	Coef.	t-	p-	Coef.	t-	p-
ERR	1.938	2.712	0.009	-3.707	-	0.009
EDR	-9.259	-1.00	0.318	0.043	0.00	0.998
SRR	10.355	1.974	0.046	3.956	2.17	0.032
BVPS	0.001	2.16	0.038	-0.001	-0.17	0.865
EPS	0.007	0.90	0.366	0.006	1.965	0.048
LEVERAGE	1.170	7.39	0.000	1.967	11.05	0.000
AGE	0.1518	0.67	0.502	-7.661	-1.83	0.070
Size	-5.541	-0.65	0.514	14.305	0.41	0.681
Constant	3.850	4.06	0.000	213.071	3.60	0.000
Observations	190			190		
R-squared (R^2)	0.9458			0.9352		
Adjusted R^2	0.9245			0.9073		
F-stats	217.783			167.025		
Prob. > F-stats	0.000			0.000		
Prob. of	0.034			0.034		
Durbin-Watson	2.192			2.015		

Table 1 presents the results of the impact of environmental reporting on the ROE of the listed firms. The relationship between ERR and ROE has been tested, and Table 1 suggest a significant negative relationship (coefficient = -3.707) and p = 0.009). The results imply that adopting environmental reporting by South African listed manufacturing firms decreases their ROE. This result may be due to the additional cost incurred in preparing environmental reporting. Moreover, it has been observed and anticipated that societies are always alert and concerned about the impact of firms' business activities; otherwise, the public always has good thoughts about firms' reputations. Hence, reporting on the environmental impacts of their operations may erode such positive perceptions about firms,

which may negatively affect their performance. Thus, environmental reporting is regarded as an outflow of spending, resources and time. Consistently, Hanić, Jovanović and Stevanović (2021) revealed a significant and negative link between the quality of environmental information and financial performance.

Table 1 shows an insignificant positive relationship between environmental degradation reporting and a ROE coefficient of 0. 043 and p-value = 0.998. This result suggests that South African listed manufacturing firms that report on their environmental conservation and degradation activities do not significantly benefit from it in terms of an increase in ROE. Similar to the evidence reported by Horsfall and Womenazu (2022) in Nigerian oil and gas companies revealed an insignificant positive relationship between environmental cost and ROE. The possible logic behind these findings is that investors might have noticed the inconsistencies in the environmental reports; hence they may have abandoned such reports. This indicates that companies have not done enough interference in equipping and educating managers on how to present environmental information in a manner that will grab investors' and stakeholders' attention. In respect of this point of view, South African listed manufacturing firms must revamp environmental information disclosures to enhance their confidence in potential and existing stakeholders.

There are several induced factors of environmental degradation, such as excessive carbon dioxide, fossil fuels, the greenhouse gas effect, air pollution, water pollution and land pollution. Manufacturing firms' business activities result in factors which affect the environment at large. In affiliation with such environmental impacts, manufacturing firms now have to report on environmental degradation activities on their annual integrated reports. This may not assist them in terms of publicity, which can negatively affect investors' returns.

Table 1 further presents the impact of social responsibility reporting (SRR) on ROE. The results revealed a positive Coefficient of 3.956 and significant (p= 0.032) relationship between SRR and ROA, meaning that a realisation of an increase in SRR results in a positive response on ROE. These results imply that South African listed manufacturing firms have managed their social responsibility reporting well, which has increased ROE. In essence, these results support the idea that social responsibility activities, especially activities that aim to express firms' long-term commitment to the interest of stakeholders can be used as a component to uplift firms' reputation (Hu *et al.* 2021). The study results suggests that South African listed manufacturing firms have put great initiative on social responsibility practices that uplift communities; social responsibility information has been disclosed to a large extent, making it possible for all the stakeholders to have access to the information of their interest. This has built the confidence of individuals in many companies. By scrutinizing the annual integrated reports, the researcher observed that many firms gradually gained value over the years. This finding confirms the views of Zeng (2016), who affirmed that the higher the firms' CSR rankings, the more likely it is to enhance their market value. In accordance with the results, it is recommended that firms should invest more resources towards social responsibility resources. Although social responsibility activities are a form of expenses, they are the expenses that lead to competitive advantage, higher levels of profitability and better performance. It is then recommended that South African listed manufacturing firms must continue investing more resources in social responsibility activities to better the firm performance.

The book value per share in Table 1 with a Coeff=-0.001 and a p-value = 0.865 indicates an insignificant negative link. The size has an insignificant positive relationship, suggesting a negative association with the value of firms and supporting the assumption that some investors consider the net assets worth as a better indicator in weighing the potential returns of investing in particular manufacturing firms. This evidence is inconsistence

with the findings of the study of Setiadharma and Machali (2017), where it is outlined, that Indonesian stakeholders pay lesser attention to accounting information and size when making investment decisions. This shows that majority of stakeholders are only interested on environmental and social information rather than financial information, perhaps there is even a possibility that the that firms publish and sell low-valued stocks at expensive prices simple because the investors are more than consumed by the non-financial information. In accordance to this view point, it is better when both financial and non-information are used together, because the two set of information are complementary items.

4. Conclusion

The current study investigating the relationship between environmental reporting using ROE as a measurement of profitability. The regression analysis method was used to test the relationship between variables. When profitability was measured by ROE, the results revealed a negative and significant relationship. These results suggest that the adoption of environmental reporting means additional resources and funds to manufacturing firms. Thus, these results are contrary to the legitimacy theory , as Ashton, Russell and Futch (2017) argues that firms with high revenue are more capable to dedicate more resources to environmentally friendly as this initiative may assist in generating more levels of revenue which may lead to better profits(Al Hawaj and Buallay 2022) . These results imply that investors do not consider environmental reporting as one of the factors to consider during economic decision-making. Besides, stakeholders' preferences differ, which is why manufacturing firms need to take note of majority shareholders' views regarding environmental reporting and ensure that these views are addressed and highlighted in their annual integrated reports. Perhaps these results raise a query of how manufacturing firms can improve their ROE by adopting environmental reporting. It is recommended that firms should take time to study and understand their direct stakeholders, especially those that are prominent and deliver accordingly to ensure that the expenditure costs incurred concerning environmental reporting do not exceed the expected benefit, also considering that the initial goal of every profit organisation is to make profits and to maximise shareholders' wealth (Hossain, Islam and Reza 2022).These results may also reveal that manufacturing firms are more responsible and accountable for their actions regardless of the impact that environmental reporting has on its ROE. This study exclusively covered South African manufacturing firms listed on the JSE, excluding other firms in other industries. As a result, the evidence of other emerging studies from other countries needs to be examined and used in the literature to a certain extent. This is because the environmental and social commands and culture differ from one country to another. In addition, other studies need to examine the factors influencing firms' decisions to adopt environmental reporting.

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