WASTE REDUCTION STRATEGY AND FINANCIAL PERFORMANCE OF FIRMS LISTED ON THE JOHANNESBURG STOCK EXCHANGE, SOUTH AFRICA

Obey Dzomonda, University of Limpopo

ABSTRACT

The purpose of this study was to evaluate the effect of the waste reduction strategy on financial performance of firms listed on the Johannesburg Stock Exchange. The study was quantitative in nature and it used secondary data. The secondary data was collected from the firms' websites from 2011-2018 using a sample of 32 firms. This resulted in 256 observations. The independent variable was waste reduction, and the dependent variable was financial performance as measured by the Tobin's Q. Using the feasible generalized least squares, the findings showed that waste reduction strategies positively predict the future value of a firm as measured by the Tobin's Q. The implication of this is that the concerned firms were able to send a strong signal to the external environment regarding their waste reduction commitments. The findings of the current study are of value as they add value to the body of knowledge through new empirical findings. Additionally, the findings are also crucial in influencing internal waste management policies of listed firms where the managers can align their internal policies to national waste management targets. The findings can also be useful to the academia where other scholars can use this study as a foundation for future studies. Due to environmental concerns, listed firms are recommended to be innovative in their approach to waste management, yet realizing the financial goals of the firm.

Keywords: Johannesburg Stock Exchange, Financial performance, Tobin's Q, Waste Reduction, Strategy, South Africa.

INTRODUCTION

The issue of waste deserves urgent attention in several developing countries (Olley et al., 2014). Alas, a study by Aleluia & Ferrao (2016) note that the issue of waste management is not prioritised in most developing countries as exhibited by low budgets set aside to tackle this challenge. South Africa is not immune to the looming challenge of waste management in developing countries (Dube, 2017). The country still lags behind in terms of waste management as compared to most developed countries (Godfrey & Oelofse, 2017). The country still relies more on the traditional way of handling waste as opposed to the new and innovative ways adopted by other developed countries. Worryingly, South Africa is running short of space for more dumping sites, which is a cause for concern. On another type of waste, Kings (2017) reports that huge quantities of untreated sewage are discharged into rivers in South Africa on a daily basis, and approximately 70% of waste generated by industries is dumped every day (Askham & Van der Poll, 2017). This cause's environmental damage as most of this waste is untreated. Reports also indicate that South Africa is faced with serious challenges of e-waste (Mhlanga, 2018).

Waste reduction is regarded as one of the key predictors of high growth and business' profitability (Jo et al., 2015). Another advantage imbedded in waste management is the sale of recycled materials to industries and individuals who use such as raw materials (Raj & Seetharaman, 2013). On that note, Saari (2017) reported that firms can make extra revenue

from the sale of byproducts and recycled materials. Existing examples such as Patagonia Inc have managed to obtain value from recycling and minimising waste (Kiron et al., 2017). The firm was able to realise a revenue growth of 14% while its profits increased by 300% when it initiated a campaign to encourage its clients to reuse their products instead of dumping them. Ochiri et al. (2015) analysed the likelihood of waste reduction to influence the performance of firms in Kenya. The study indicates that waste reduction strategies enable a firm to cut costs significantly by eliminating storage space, breakages and landfill space demand. Conversely, other scholars contest this view and argue that investing in assets to support the waste management strategy may erase the potential of a firm to be profitable (Sukholthaman & Sharp, 2016). Hence, this shows that there is an inconclusiveness of findings regarding the link between waste reduction and financial performance of listed firms. This justifies the need for this study especially in the context of firms listed on the Johannesburg Stock Exchange in South Africa.

LITERATURE REVIEW

Waste Management

Waste is defined as something discarded from human activities (Dube, 2017). There is agreement in existing literature that waste can be liquid waste, solid waste, medical waste, which can further be divided into two broad categories which are hazardous and non-hazardous waste. Waste management is defined as processes put in place by firms and households to sort, collect, reuse, reduce and recycle waste produced from different activities. There should be a shift from the traditional approach to waste management where organisations and individuals concentrated only on collecting and dumping the waste to more innovative ways that emphasise waste reduction, reuse and recycling (Jerie & Tevera, 2014). Jerie & Tevera (2014) further highlight the need for stricter and efficient waste management from the production process to end users of products. Putting controls in each stage helps to eliminate waste (Mihai & Ingrao, 2018).

Waste Management Strategies

Efficient waste management can be attained by leveraging on the waste management hierarchy (Godfrey & Oelofse, 2017). Waste should be handled in a manner which protects and preserves the environment (Das & Bhattacharyya, 2015). On that account, Greyling (2017) there is need for a holistic approach to waste management, where everyone participates in the reduction, reuse and recycling of waste.

Zero waste: Zero waste is regarded as the best alternative where waste is eliminated from resource extraction and production stages (Godfrey & Oelofse, 2017). This involves investing in standards and quality techniques such as total quality management, which emphasises zero tolerance to waste. However, this remains difficult to attain as it requires huge investments in technology.

Reduce: There has been increased pressure on people, organisations and firms to reduce the amount of waste they generate on a daily basis (Maleka et al., 2017). Proponents of this campaign submit that waste reduction is achievable through cutting down unnecessary consumption and reducing excessive packaging (Rodrigo, 2015). Another strand of existing literature suggests the integration of systems such as the Enterprise Resource Planning (ERP) and Material Flow Cost Accounting (MFCA) to effectively reduce waste (Fakoya, 2015). The MFCA can be used to generate both financial and non-financial waste information, which firms can use proactively to reduce waste (Fakoya, 2015). MFCA generates information that can assist a firm to reduce waste from the production process to the end user of the product

(Debnath, 2014) as it eliminates material flow and process inefficiency (Fakoya, 2015).

Re-use: Another workable solution to the waste crisis is the re-use strategy where different packaging materials are re-used for some other purposes after the contents are finished instead of throwing them away (Rodrigo, 2015). His study argues that a firm can be able to cut costs through waste minimisation if they efficiently adopt the refilling packaging system. Reusable material can enable a firm to eliminate waste significantly downstream at the consumption side. This means that customers can be educated on how to reuse the product's packages for other domestic purposes. Such a strategy greatly reduces the amount of waste disposed at dumping sites (Global Reporting Initiative, 2019).

Recycle: This strategy is effective in eliminating waste, hence, minimising the need for a landfill (Godfrey & Oelofse, 2017). Recyclable waste includes paper/card, glass, plastic and metals produced in different industries. Instead of throwing away waste, firms are encouraged to utilise reverse production/logistics, where they absorb their waste back into the production process to produce new products. Reverse logistics is becoming crucial in the era where waste is becoming one of the worst challenges experienced globally (Hsu et al., 2016). Alternatively, they can sell their waste to other businesses that can use them as raw materials for their products (Aitken & Harrison, 2013). It is mostly the informal sector which is actively involved in the recycling of waste more than other established organisations and businesses (Department of Environmental Affairs, 2016). Godfrey & Oelofse (2017) note that recycling has long been implemented in South Africa but has only managed to divert 0.1 of the total waste, and 0.9 still find its way to the dumping sites. Hence, their study argues that recycling is still under developed and not implemented seriously in South Africa.

Relationship between Waste Management and Financial Performance

There is an inconclusiveness of findings regarding the link between the waste reduction strategy and financial performance. Other studies report a positive and significant relationship, yet others argue that investing in waste reduction technologies may negatively erode the profits of the business. For instance, Song et al. (2017) studied how environmental management influences a business' financial prospects. The study results established that a firm's environmental management behaviour such as waste reduction and recycling positively influence a firm's ability to meet its financial goals. Managing the environment through initiatives such as waste reduction can be a good strategy to reduce production costs which translates into desirable firm financial performance (Graham & McAdam, 2016). A plethora of researchers have also submitted that waste reduction strategies can effectively enhance the performance of a business. The direction of the relationship is reported to be positive. Other studies also found that effectively cutting on waste can help a firm to attain its financial goals and delight shareholders (Ochiri et al., 2015; Henri et al., 2016). Ochiri et al. (2015) analysed the likelihood of waste reduction to influence the performance of firms in Kenya. The study indicated that waste reduction strategies enable a firm to cut costs significantly by eliminating storage space, breakages and landfill space demand. Significant cost savings brought by waste reduction directly and positively improve the financial performance of firms. Conversely, another strand of scholars argues that investing in assets and technologies for waste collection and treatment may erase the potential of a firm to be profitable (Sukholthaman & Sharp, 2016). The authors argued that such results are because implementing a waste reduction strategy can be costly. During the initial stages, the firm must invest in trucks, people to sort the waste, waste treatment and training of the workforce. The cost of waste sorting can negatively impact the cash flows of the firm in the short term. For instance, the firm has to hire extra employees to deal with waste sorting. Payroll is one of the elements which make up the biggest part of the cost structure of a firm. Waste

management also entails changing the entire system which might require the firm to invite experts to come and train its employees. Since most external training bills are based on hourly rates, the costs of training alone can erode the firm's profits resulting in losses.

The author of this study is of the view that high environmental performance in terms of effective waste management amounts to positive financial performance. This is because firms can benefit financially from waste recovery, recycling and reuse of some of the components in the production process. Due to incidences of unfavourable hazards caused by mismanaged waste, several stakeholders such as customers, environmental pressure groups, the government and responsible investors have started extending preference to firms which excel in waste management. Effectively and efficiently managing waste can enable a firm to eliminate costs associated with procuring of new raw materials. Additionally, reducing the amount of waste that goes to the landfill enables firms to lower transportation costs and these savings can be used to improve other areas of the business which may result in positive financial performance. More importantly, firms which are proactive in managing their waste at all stages of their business circle can attract favourable ratings and loyalty from environmentally sensitive stakeholders such as the community, investors, the government, employees and supply chain partners which may boost their financial performance. From the above analysis, this study hypothesises that:

H_a: *Waste reduction positively predicts financial performance of firms listed on the Johannesburg Stock Exchange*

MATERIALS AND METHODS

A quantitative research method was adopted for this study. The longitudinal design was adopted where the researcher collected panel data from 2011-2018. All firms listed on the JSE were considered as the population of this study. A sample of top 32 FTSE/JSE listed firms was considered. This list was considered because these firms excel in terms of Environmental Social and Governance (JSE, 2020). Secondary data was collected for 8 years. This resulted in 256 observations. Data related to financial performance was collected from the firms' annual financial reports. Some of the financial data was obtained from the IRESS database. Data related to waste reduction was collected from sustainability reports. Content analysis was used to collect and code data related to waste reduction because of lack of consistency in reporting this variable among the selected firms. Data was analyzed using the Panel regression analysis model. Specifically, the Fixed Generalized Least Squares model was used run to the data. The Fixed Generalized Least Squares model was used because it suppresses heteroscedasticity and serial autocorrelation.

Dependent Variable

The dependent variable was financial performance. Specifically, the Tobin's Q was used to measure financial performance. The Tobin's Q is a market-based measure of financial performance which is highly regarded as a key ratio that informs future investment decisions in existing literature (Fu et al., 2016). Hence, an understanding of how firm's future value is perceived by investors is crucial since investors now concerned about the future value of the business (Fu et al., 2016). Ideally, the Tobin's Q is the most preferred market-based ratio to measure the long run effects of certain investments (Sethibe & Steyn, 2016).

Independent Variable

Waste management is defined as practices implemented by a firm to handle waste in a

way that minimises environmental pollution (Bartolacci et al., 2015). This study adopted the GRI indicators of waste management. As such, waste management was measured based on the following indicators: amount of waste recycled, amount of waste reused, waste reduction initiatives and use of alternative raw materials with less waste.

Dependent variable; Y: Financial performance

Dependent variable 1; Y: Tobin's Q

Independent variable; X: Waste reduction

Independent variable 1; X1: waste reduction

Panel regression model

$$Yit=\alpha+X1it+X2it++X3it+ \varepsilon$$

Where y=financial performance; i denotes the firm; t denotes the time; x1= waste reduction; x2=firm size; x3=Liquidity; + ε = error term; α= constant

Control Variables

This study used firm size and liquidity as control variables. These factors are reported to also have an effect on financial performance (Horváthová, 2016). According to Al Shahrani & Tu (2016), firm size is a key determinant of financial performance. It is reported that the effect of firm size may vary between small and large firms (Tarziján & Ramirez, 2011). In this study, market capitalisation was used to measure the size of the firm. Marashdeh (2014) express that it is also crucial to control for liquidity since it affects profitability. Liquidity was measured by compiling values from the current ratio of firms which were evaluated. The data was obtained in the firm's annual financial statements and from the IRESS database. Hence, it is crucial to control firm size and liquidity before testing the relationship between the waste reduction strategy and financial performance.

RESULTS

Descriptive Statistics

Table 1 DESCRIPTIVE STATISTICS					
Variable	Obs	Mean	Std. Dev.	Min	Max
Waste reduction	256	3.382813	1.092729	0	4
Tobin's Q	256	1.673086	1.341552	0.22	7.05
Liquidity	256	1.425118	0.9830142	0	6.8176
Firm size	256	9297.23	47711.28	0	428668

Table 1 present descriptive statistics for key variables of the study. Considering waste reduction, the mean was 3.382813 and the standard deviation was 1.092729, with a minimum value of 0 and a maximum value of 4. The mean for Tobin's Q was 1.673086 and the standard deviation was 1.341552. The minimum and maximum values for Tobin's Q were 0.22 and 7.05, respectively. The findings showed that the mean for liquidity was 1.425118 and the standard deviation was 0.9830142. The minimum value for liquidity was 0 and the maximum value was 6.8176. Considering firm size, the mean score was 929723 and the standard deviation was 47711.28. The minimum value was 0 and the maximum value was

428668.

Correlation Analysis

		Table 2		
		CORRELATION ANALYSIS		
Variables	Liquidity	Firm size	Tobin's Q	Waste reduction
Liquidity	1			
Firm size	-0.0061	1		
Tobin's Q	0.4210	0.0234	1	
Waste reduction	0,2134	0.0331	0.0245	1

Table 2 presents findings on correlation among variables. The results show that liquidity was negatively correlated with firm size (-0.0061) while the Tobin's Q was positively correlated with liquidity (0.4210) and firm size (0.0234). The findings also showed that a positive correlation was established between waste reduction and liquidity (0.2134). Also, a positive correlation was established between waste reduction and firm size (0.0331) as well as with the Tobin's Q (0.0245).

Relationship between the Waste Reduction Strategy and Financial Performance

		Table 3				
		MODEL 1 FGLS REGRESSION – TOBIN'S Q				
Cross sectional time series FGLS regression						
Coefficients: generalized least squares						
Panels:	heteroskedastic					
Correlation: common AR (1) coefficient for all panels				(0.0937)		
Estimated covariances	=	8		Number of obs =		256
Estimated autocorrelations	=	1		Number of groups=		32
Estimated coefficients	=	11		Time periods =		8
				Wald chi2 (10) =		72.1
				Prob >chi2 =		0.000
Tobin's Q	Coef.	Std.Err.	z	P>|z|	[95% confi.	Interval]
Waste reduction	0.1542573	0.0916638	1.68	0.092	-0.0254005	0.33391
Liquidity	0.2565272	0.0728444	3.52	0.000	0.1137548	0.399299
Firm size	6.43e-06	1.56e-06	4.11	0.000	3.36e-06	9.49e-0
__cons	3.459262	1.084525	3.19	0.001	1.333632	5.58489

Table 3 presents findings on the link between waste reduction and financial performance. The findings show that the link is positive and significant at the 10% significance level. As such, the hypothesis which stated that, **Ha: *Waste reduction positively predicts financial performance of firms listed on the Johannesburg Stock Exchange*** was accepted. This means that waste reduction strategies positively predict the future value of a firm as measured by the Tobin's Q.

DISCUSSION OF FINDINGS

Table 3 presents findings on the link between waste reduction and financial performance. The findings showed that the waste reduction strategy positively and significantly predicts financial performance at 10% significance level. This means that waste reduction strategies positively predict the future value of a firm as measured by the Tobin's Q. The implication of this is that the concerned firms were able to send a strong signal to the external environment regarding their waste reduction commitments during the period under study. Based on the assumptions of the the stock market efficiency hypothesis (Fama, 1970),

sending a strong signal to investors about the firm's initiatives is very crucial. This is because investors are always updated with current information regarding the firm's activities (He, Chakrabarty & Eden, 2016). The findings of this study are further supported by existing findings from other contexts. For instance, Song et al. (2017) studied how environmental management influences a business' financial prospects. The study established that a firm's environmental management behavior such as waste reduction and recycling positively influence a firm's ability to meet its financial goals. Managing the environment through initiatives such as waste reduction can be a good strategy to reduce production costs which translates into desirable firm financial performance (Graham & McAdam, 2016). A plethora of researchers have also submitted that waste reduction strategies can effectively enhance the performance of a business. The direction of the relationship is reported to be positive. Other studies also found that effectively cutting on waste can help a firm to attain its financial goals and delight shareholders (Henri et al., 2016). Ochiri et al. (2015) analyzed the likelihood of waste reduction to influence the performance of firms in Kenya. The study indicated that waste reduction strategies enable a firm to cut costs significantly by eliminating storage space, breakages and landfill space demand. Significant cost savings brought by waste reduction directly and positively improve the financial performance of firms.

CONCLUSION

The purpose of this study was to evaluate the effect of the waste reduction strategy on financial performance of firms listed on the Johannesburg Stock Exchange. The study was quantitative in nature and it used secondary data. The secondary data was collected from the firms' websites from 2011-2018 using a sample of 32 firms. Using the feasible generalized least squares; the findings showed that waste reduction strategies positively predict the future value of a firm as measured by the Tobin's Q. The implication of this is that the concerned firms were able to send a strong signal to the external environment regarding their waste reduction commitments during the period under study. The findings of the current study are of value as they add value to the body of knowledge through new empirical findings. Additionally, the findings are also crucial in influencing internal waste management policies of listed firms where the managers can align their internal policies to national waste management targets. The findings can also be useful to the academia where other scholars can use this study as a foundation for future studies. Due to environmental concerns, listed firms are recommended to be innovative in their approach to waste management, yet realizing the financial goals of the firm.

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