

# Impact of Corporate Environmental Resource Conservation on Revenue and Equity Performance – The Moderating Effect of Black Economic Empowerment (BEE)

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**Abstract** This paper aims to appraise the impact of energy reduction on revenue, return on equity (ROE) and adjusted headline earnings per share (aHEPS). It also aimed to assess the effect of energy reduction on revenue, ROE and aHEPS, and to examine the moderating role of black economic empowerment (BEE) on the effect of energy and water reduction on revenue, ROE and aHEPS. Secondary data from Woolworths Holdings Good Business Journey Report were analysed by using the OLS regression analysis. The results from the analysis show that energy reduction and water reduction have a significant effect on the three dependent variables namely revenue, ROA and aHEPS with a  $P < 0.05$ . Furthermore, the results also show that after the BEE is introduced as a moderating independent variable, water and energy reductions show a stronger impact on revenue and aHEPS as the addition of BEE produced a stronger coefficient of correlation (R) and coefficient of determination ( $R^2$ ). This finding offers a practical significance to bolster corporate environmental management and financial sustainability strategy. This paper thus demonstrates that corporate attention and capacitation of previously disadvantage population through Black Economic Empowerment (BEE) has a visible short-term and long-term financial implication, which are drawn from improved corporate legitimacy, approval from the community with attendant

enhanced patronage. This paper contributes to the literature by proposing a framework for understanding the moderating role of BEE on the effect of water and energy reduction on revenue, return on equity and adjusted headline earnings per share. The paper thus offers an agenda for future researchers on the accounting and financial implication of BEE performance.

**Keywords** Return on Equity, Revenue, Adjusted Headline Earnings Per Share, Water Reduction, Energy Reduction, Black Economic Empowerment, Environmental Accounting, Sustainability Accounting

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## 1. Introduction

The fundamental objective of business is to provide financial returns to the investors (the owners). Accordingly, the financial focus of business and accounting has survived with little challenge over the past decades [1]. However, contemporary environmental challenges have moderated the old-age view of the purpose of business and accounting in society and environment. Therefore, the modern business corporation has metamorphosed with diverse pronged objectives that overshoot sole financial rewards

and/or shareholder interests. In the 1970s, the Nobel economist, Milton Friedman philosophized that businesses have a single social responsibility, which is to engage in business activities that increase profits for shareholders whilst obeying the laws of the nations. This simply meant, “*The business of business is business, and the sole focus of the CEO is to maximize the profits of that business*” [1 p.1]. However, the CEO Roundtable of 2019 rearranged the prioritization of the purpose of business by placing the stakeholder, social and environmental responsibilities as the foremost purposes that a business should strive to achieve before the profit objective. The CEOs maintain that achieving these prioritized objectives will facilitate the achievement of profit objective of business [1]. Accordingly, attending to the sustainability objectives (social and environmental exigencies) contributes to the financial objectives of business. Water and energy are, amongst others, key environmental and resource challenges of modern businesses due to it becoming more limited and expensive.

Increasing growth in human population and human activities coupled with unprecedented bourgeoning of manufacturing businesses contributes to the current strain on water and energy availability [2,3]. Therefore, population expansion and growth of businesses have meant increased competitions on water usage between humans, industry and, flora and fauna (plants and animals) as explained in a research for a modified approach to water by Falkenmark [4]. In the same vein, energy supply possesses a significant challenge to both households and industries especially in developing countries. Smooth and continuous manufacturing operations are stalled when energy supply gets interrupted, it thus becomes vital that corporations adopt energy savings strategies which have been recognised in research as having a direct contribution to corporate financial success [5,6].

In their Good Business Journey Report, Woolworths Holdings [7] highlights that social challenges facing South Africa’s development are even overlaid by substantial environmental stress, which includes *inter alia* water scarcity and instability in energy supply. This sentiment from the industry thus makes it vital that water and energy resource conservation receives the necessary priority to achieve the profit goal of the corporate and maintain a balanced corporate environmental sustainability. In search for avenues for business, success local community empowerment has been elevated as a vital strategy for responsible business operations, with profit potential. Hence, Scheyvens [8] highlights that business operations may be considered more successful if local communities are empowered to draw benefit from the business. This local community empowerment value is recognised by Woolworths Holdings Ltd South Africa [7], which motivates the company to include Black Economic Empowerment as part of its sustainable business strategic objectives.

Much of existing literature on corporate environmental responsibility and profitability dwells on corporate operations in advanced countries; however, some multinational businesses in developing countries such as South Africa recognise and engage in environmental resource conservation and empowerment of local community towards poverty alleviation. This is captured in Woolworths’ Good Business Journey Report:

*“In South Africa, key developmental challenges include the need to alleviate poverty, reduce inequality and create jobs, to improve education and grow the number of skilled people ready to join the job market”* Woolworths Holdings [7, p.6]

Doing business in a developing country, especially in South Africa with a checkered history of past oppression of black communities comes with an additional sustainability strategy for the corporates that operate in it. Corporate legitimacy has to be proven in practice to gain approval and support of the local communities and the government to enhance successful business operations.

*“At the same time, meeting our commitments in terms of economic transformation in South Africa in line with Broad Based Black Economic Empowerment (BBBEE) remains deep at the heart of Woolworths’ agenda”.* Woolworths Holdings [7, p. 25]

These literature instances infer that industrial water and energy efficiency are rising in importance for society and the environment and is becoming a top concern for various corporate managements. Water and energy are an indispensable input in many industrial production processes and operations [9]. Accordingly, managers deserve to be equipped with a better awareness of the implications of water and energy efficiency to catapult their businesses to a desired zenith amidst the urgency for environmental resources sustainability, which offers financial enhancement potential [10,11]. In their research, Fu and Jacobs [2] highlight that numerous industrial processes consume water, which include *inter alia* fabrication, washing, cooling, transporting, and diluting. Fu and Jacobs [2] indicate that water has typically received less management scrutiny than other process inputs due to its nontoxicity, recyclability, relative availability, and affordability. However, the increasing cost and scarcity of water mean that industries will experience an increase in costs, which thus attracts public attention and hence the need for management’s renewed focus on the need for water resource conservation [2].

Amidst bourgeoning literature on water-energy conservation and financial performance, there is an apparent paucity of literature on the effect of energy and water resources conservation on corporate revenue and equity with a moderating effect of Black Economic Empowerment, hence this paper contributes by developing a model in sustainability accounting literature specifically related to Southern Africa. This focal area aligns with the

literature, which highlights the importance of alignment management goals and action with sustainable development imperatives [12].

This paper aims to achieve three main objectives namely to evaluate the effect of energy reduction on revenue, return on equity (ROE) and adjusted headline earnings per share (aHEPS). It also aims to assess the effect of energy reduction on revenue, ROE and aHEPS, and to examine the moderating role of black economic empowerment (BEE) on the effect of energy and water reduction on revenue, ROE and aHEPS.

## 2. Related Literature

Li [13] evaluated the extent to which institutional forces, environmental innovation practices, and performance are related. Li [13] specifically investigated the resource commitment's moderating impact on the effects of environmental innovation approaches. Accordingly, the findings by Li [13] showed that environmental innovation techniques have a considerable beneficial impact on a company's environmental performance, but the impact on financial performance should be seen through the environmental performance acting as a mediating factor. Further investigation demonstrates that the level of resource commitment moderates the association between corporate environmental improvement approaches and financial performance. The financial performance produced by environmental innovation methods will be better as resource commitment rises [13].

Furthermore, in his analysis of natural resources challenges Li (2014) [13] highlights that everything from food to fuel and forests is facing a continuous negative impact by the global environmental catastrophe, which includes global warming, the oil crisis, and fast expanding populations. Accordingly, many nations are enthusiastically supporting environmental advocacy in line with the trend. Therefore, Li [13] advises that modern business may survive current market competitions by incorporating environmental sustainability as part of corporate strategic goals.

Li [13] proceeded to refer to the works of (Perc & Szolnoki, 2010 [14]), wherein group behaviour is recognised as a factor in the process of evolution of environmental events and human processes that impact business, economics, commerce and humans. Thus, they use game theory to analogously describe and bring to the fore how organisations should embrace sustainability orientation in order to remain relevant in an evolving business environment where environmental sustainability is becoming a key to survival. Therefore, they opine that group interactions shape evolutionary processes, and in evolutionary games, participants' tactics change through time, favouring those with higher fitness (Li, 2014; Perc & Szolnoki, 2010 [13,14]). Therefore, actions of

individuals (such as the distribution of investments) will be influenced by those of other players during the co-evolutionary process (Perc et al., 2013 [14]). As a result, in order to thrive in a cutthroat market, each company must improve its capacity for expansion and survival through interaction with and satisfaction of other players, and it must also make environmental sustainability a primary organizational goal in addition to profit [14].

Relying on the context of coevolution and business sustainability, Schaltegger et al (2016) [15] argue that despite the importance of corporate environmental sustainability, little is known about the contexts that business models play in processes of sustainable entrepreneurship that attempt to scale up ecologically and socially advantageous niche models or to upgrade established mass market players' sustainability. Hence, the research by Schaltegger [15] which is based on evolutionary economics, develops a theoretical model to examine the co-evolutionary business strategy growth for market pioneers in sustainable niches and traditional mass-market companies. In order to support structured investigations of the interplay between economic model innovation and sustainable revolution of markets, Schaltegger et al [15] relied on the development of a framework for sustainable business and market transformation. Their core approach which comprises business strategy diversity, choice, and stability, and evolutionary routes is established to guide businesses in fashioning improved environmental sustainability with a dual advantage of maintaining corporate value and at the same time ensuring environmental citizenship [15].

The effect of water reduction on corporate financial performance is receiving growing attention by researchers who find diverse results with majority pointing to financial savings and hence positive financial performance arising from improved manufacturing processes that lead to water reduction ([18] Weber & Saunders - Hogberg, 2020; Fu & Jacobs, 2022 [2]).

In their analysis of how efficient water usage might affect financial performance, Fu and Jacobs (2022) analyzed a sample of 155 companies using yearly good corporate and financial tracking measures from Bloomberg for the period 2010–2019. According to this study, there is compelling evidence that operational effectiveness modifies the connections between water efficiency, revenue, and risk. Efforts towards increased water efficiency in manufacturing operations enhance effective businesses, elevate profits, and lower potential and actual risks. However, this study discovers the reverse impacts for businesses that are not operationally effective. These results propose a minimum operational efficiency standard that businesses should meet before they may profit financially from gains in water efficiency ([2] Fu and Jacobs, 2022).

Johnson [17] evaluated the effect of environmental, social and governance performance on business financial

success. They applied a panel data regression by using a sample of 359 observations with ESG being the predictor variables. They also considered both accounting, market and value based financial performance measures. Their findings show a significant relationship upon disaggregating the score on ESG disclosure.

Reduced water consumption also lowers water purchase costs and reduces the need to pump, heat, or cool water for internal uses. A comparable source of competitive advantages and value for firms can be anticipated given that the resources and abilities that allow firms to minimize water use are comparable to those required to decrease other process inputs.

This paper resonates with the eco-efficiency theory of Porter and Van der Linde [16]. According to their viewpoint, businesses may maximize their efficiency, or their ability to cut costs and provide financial value, while also reducing their environmental effects. Accordingly,

analysis of the potential connections between environmental quality and economic performance has been a burgeoning dimension of sustainability accounting research.

Although environmental resource efficiency and its impact on financial performance have been the focus of several recent studies, it is scarce to see any of these extant researches, which have used a combination of the following three dependent variables as financial performance proxies: revenue, return on equity and adjusted headlines earning per share. In addition, it is scarce to see the above three financial performance proxies being predicted by water and energy reduction, and moderated by Black Economic Empowerment (BEE). Accordingly, this paper contributes to existing literature through the evaluation of the above relationships through the development of the following conceptual framework as presented in Figure 1 and Figure 2.

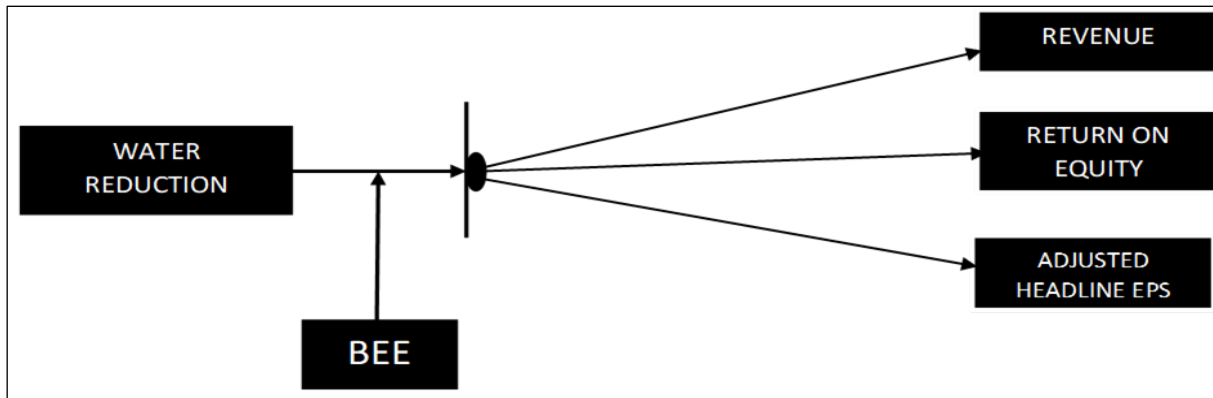


Figure 1. Conceptual framework for the effects of water reduction on changes in revenue, return on equity and adjusted headline EPS

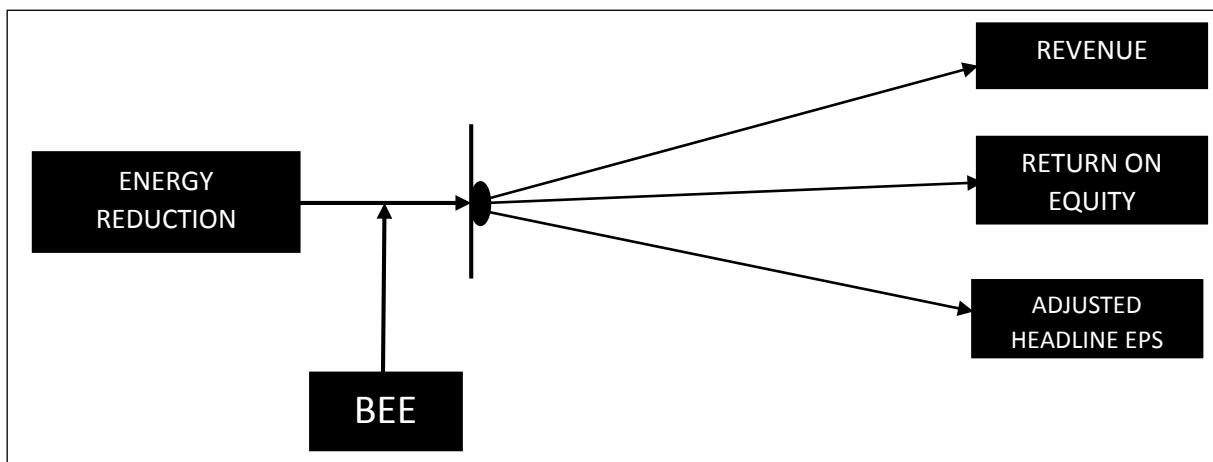


Figure 2. Conceptual framework for the effects of energy reduction on changes in Revenue, return on equity and adjusted headline EPS

### 3. Method

The paper used sustainability performance data from the Woolworths Good Business Journey Report over a

period of seven years (2011 – 2017). Energy reduction and water reduction were used as two key independent variables. Accordingly, in the first level analysis, water and energy reductions were used as single standalone independent variables – as predictors of revenue, return on asset (ROA), and adjusted headline earnings per share (aHEPS). However, the second analysis, added Black Economic Empowerment (BEE) to evaluate its moderating effect on the strength of statistical effect of water and energy reductions on revenue and ROA. Therefore, the paper used the OLS to conduct data analysis and the strength of the BEE moderating effect was evaluated on the basis of how the coefficient of correlation (R) and the coefficient of determination ( $R^2$ ) differ in the two levels of analysis. The  $R^2$  is used in this research to determine the strength of the effect of independent variables on the dependent variable because  $R^2$  is the most extensively used ‘goodness-of-fit’ statistic in modelling predictions and measurement of relationships [19].

In addition to revenue and ROA, the paper also evaluated the effect of water and energy reduction on the adjusted headline earnings per share (aHEPS). This is because analysts prefer to evaluate companies’ earnings based on its normal operating capacity without considering incomes from exceptional earnings such as in the case of write-offs. Hence, headlines earning per share provides a more reliable measure of corporate earnings since it based only on corporate income from operations, income from trading, and income from investment.

#### 4. Results

The results from Table 1 and Table 2 show that energy reduction and water reduction have a significant effect on the three dependent variables namely the revenue, ROA and aHEPS with  $P < 0.05$ . What seems to be outstanding in the results is that the introduction of BEE performance into the analysis as a moderating independent variable increases the impact of water and energy reduction on revenue and aHEPS, hence, the addition of BEE produced a stronger relationship in terms of coefficient of correlation (R) and coefficient of determination ( $R^2$ ). BEE was measured in this research by using the Woolworths BEE numerical scores reported by Woolworths in its Good Business Journey Report [7].

This indicates that within this sample of company (Woolworths), their strategy and performance on Black Economic Empowerment (BEE) contribute to influencing revenue and adjusted headlines earnings per share in this company. This finding is significant as a practical example to other companies in South Africa –, which is a

demonstration that a corporate concerted efforts and investment toward the capacitation and support of previously disadvantaged population namely the black population is a good investment that rewards the company.

Although this research used Woolworths Holdings data, but the results of this research do have an important implication for other companies regarding the importance of environmental resource conservation (water and energy) on revenue and equity performance of other companies. This is because this research introduced a social responsibility variable namely the Black Economic Empowerment (BEE), which proved to be a catalyst that spurs the efficacy of the impact of water reduction and energy reduction on revenue and equity performance. This model combination is uncommon in other related South African literature used in studying other companies’ resource efficiency and profitability. Accordingly, the implication hence, for other companies is that this finding creates an agenda for other companies in South Africa, both in retail and manufacturing to integrate BEE as a core component of their company social capital and profitability strategy. On the one hand, companies’ BEE performance attainment is a social capital since South Africa’s previous history of black exclusion has brought to the fore the current corporate BEE advocacy. On the other hand, BEE is also a profitability boosting strategy as it attracts customers for improved revenue. Accordingly, companies that excel in this domain of social responsibility are by implications adhering and respecting the national government’s equitable social and economic development growth plans. Furthermore, attaining a pragmatic level of BEE performance bestows social legitimacy on the companies that are practically demonstrating development of the black skills and economic capacitation. This research finding corroborates previous research conducted in South Korea by Park and Choi [20] on the effect of government and social legitimacy on company financial performance wherein they found an association. This research further points to the reputational implication, which BEE may bestow as a social legitimacy, which is equally supported by previous research by Brown [21] on the legitimacy effect of social responsibility, which may also result in improved revenue. This therefore indicates that other companies in South Africa may aspire to boost their revenue and equity performance through an enhanced performance in their BEE commitment. Similarly, this requires that future research should study other companies in South Africa using the model developed in this research to examine how other companies’ BEE performance may bolster the impact of their resource efficiency effect on revenue and equity performance.

**Table 1.** Summary Regression Results on the Effect of Energy Reduction on Revenue, ROE and aHEPS

Impact of Corporate Environmental Resource Conservation on Revenue and Equity  
Performance – The Moderating Effect of Black Economic Empowerment (BEE)

<b>Effect of Energy Reduction on Revenue:</b>					
Result without BEE					
	<b>Y</b>	<b>X: P-value</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	REVENUE	Energy Rdn = 0.0042	0.911445	0.830732	0.79687869
Result moderated by BEE					
	<b>Y</b>	<b>X: P-value</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	REVENUE	Energy Rdn = 0.01686	0.960706	0.922957	0.88443531
		BEE = 0.09388			
<b>Effect of Energy Reduction on Return on Equity (ROE):</b>					
Result without BEE					
<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
ROE	Energy Rdn = 0.05058	-1.204755	0.753281334	0.56743276	0.480919321
Result moderated by BEE					
<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
ROE	EnergyRdn = 0.19709	-0.536342	0.937707435	0.87929523	0.818942849
	BEE = 0.03244	-0.043055			
<b>Effect of Energy Reduction on Adjusted Headline Earnings Per Share (aHEPS):</b>					
Result without BEE					
<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
aHEPS	Energy Rdn = 0.00075	1088.46153	0.956124109	0.914173312	0.897007974
Result moderated by BEE					
<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
aHEPS	BEE= 0.457864	6.1040274	0.962572034	0.92654492	0.889817381
	Energy Rdn = 0.00671	993.699713			

**Table 2.** Summary Regression Results on the Effect of Water Reduction on Revenue, ROE and aHEPS

<b>Effect of Water Reduction on Revenue:</b>						
Result without BEE						
	<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	Revenue	Water Rdn = 0.0025669	74.7184999	0.928027445	0.86123494	0.833481927
Result moderated by BEE						
	<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	Revenue	Water Rdn:0.00655015	0.00655	0.975337031	0.951282325	0.926923487
		BEE:0.053037132	0.053037			
<b>Effect of Water Reduction on Return on Equity (ROE):</b>						
Result without BEE						
	<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	ROE	Water Rdn:0.0391230	-0.42519854	0.778688211	0.60635533	0.527626396
Result moderated by BEE						
	<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	ROE	WaterRdn:0.119374814	-0.20853975	0.949963365	0.902430395	0.853645592
		BEE:0.025260864	-0.04156871			
<b>Effect of Water Reduction on Return on Adjusted Headline Earnings Per Share (aHEPS):</b>						
Result without BEE						
	<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	aHEPS	WaterRdn: 0.00134613	367.1439015	0.944606553	0.89228154	0.870737848
Result moderated by BEE						
	<b>Y</b>	<b>X: P-value</b>	<b>Coefficient</b>	<b>Multiple R</b>	<b>R Squared</b>	<b>Adjusted R<sup>2</sup></b>
	aHEPS	WaterRdn:0.010354201	330.1801634	0.953567431	0.909290846	0.863936269
		BEE: 0.435314295	7.091958702			

## 5. Conclusions

The paper is set out to achieve three key objectives namely to appraise the impact of energy reduction on revenue, return on equity (ROE) and adjusted headline earnings per share (aHEPS). In addition, it also aimed to assess the effect of energy reduction on revenue, ROE and aHEPS, and to examine the moderating role of black economic empowerment (BEE) on the effect of energy and water reduction on revenue, ROE and aHEPS.

Secondary data from Woolworths Holdings Good Business Journey Report were analysed by using the OLS regression analysis. The results from the analysis indicate that energy reduction and water reduction have a significant impact on the three dependent variables namely revenue, ROA and aHEPS with  $P < 0.05$ . In consonance with objective three, results also show that after the introduction of BEE as a moderating independent variable, water and energy reductions show a stronger impact on revenue and aHEPS as the addition of BEE

produced a stronger relation in terms of coefficient of correlation (R) and coefficient of determination ( $R^2$ ). This finding offers a practical significance to corporate environmental management and financial sustainability. This paper shows that corporate attention and capacitation of previously disadvantaged population through Black Economic Empowerment (BEE) have a visible short-term financial implication, which likely is drawn from improved legitimacy, approval from community with attendant enhanced patronage.

In addition, this paper also offers important theoretical and academic insights to further debates and research on business environmental management accounting and finance. As an example, further research agenda might want to extend the number of years of examination and to apply the framework in proposed in Figure 1 and Figure 2 to study other companies. This paper also offers a short case study for post-graduate accounting and business administration classes.

Overall, this paper contributes to the literature by

proposing a framework for understanding the moderating role of BEE on the effect of water and energy reduction on revenue, return on equity and adjusted headline earnings per share. This paper is perhaps the first that has moderated the financial impact of energy and water reduction with Black Economic Empowerment – thus offering a future research lens to future researchers on the accounting and financial implication of BEE performance.

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