

BUSINESS SUSTAINABILITY PERFORMANCE MEASUREMENT: ECO-RATIO ANALYSIS

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Abstract

Eco-aware customers and stakeholders are demanding for a measurement that links environmental performance with other business operations. To bridge this seemingly measurement gap, this paper suggests 'Eco-Ratio Analysis' and proposes an approach for conducting eco-ratio analysis. It is argued that since accounting ratios function as a tool for evaluating corporate financial viability by management and investors, eco-ratio analysis should be brought to the fore to provide a succinct measurement about the linkage between environmental performance and conventional business performance. It is hoped that this suggestion will usher in a nuance debate and approach in the teaching, research and practice of environmental management and sustainability accounting.

Keywords: Sustainability Measurement, Sustainability Performance, Divisional Performance, Eco-Ratio Analysis, Sustainable Development, Responsible Business

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1. INTRODUCTION

Extant research indicates that eco-aware customers and stakeholders require additional measurement that links environmental performance with other business operations [14], [16]. This implies that as the campaign for business sustainability heightens, more measurement tools are needed for the development of sustainability management accounting (Tingey-Holyoak, Burritt & Pisaniello, 2013; Mokhtar, Zulkifli, & Jusoh, 2015). Whilst 2015 is critical for businesses to rethink the future of business in consideration of climate change and sustainable development, it is also apposite to reflect on new ways of evaluating business sustainability performance to satisfy the environmental yearnings of customers and stakeholders (Kolinski & Sliwczynski, 2015).

Many gaps and/or challenges in measuring sustainability performance subsists in current environmental management accounting measurement (Searcy, 2012). Sustainability accounting is regarded as a complement to financial accounting; a blend of these separate reports should proffer a clearer view of environmental, social and economic performance of business. However, the sustainability part of the current accounting measurement is still developing. This paper is concerned with one gap - the financial section of accounting reports has accounting ratios embedded into it, but environmental performance ratios or eco-ratio analysis, has not been integrated into sustainability management accounting measurement. Therefore the question that underpins this paper is how eco-ratio analysis may

be brought into current sustainability management accounting. Accordingly the sole objective of this paper is to propose the introduction of eco-ratio analysis and to suggest an approach for conducting eco-ratio analysis as an additional sustainability performance measurement tool. Accordingly, the next section of this paper presents a brief related literature; following this, a suggested approach to eco-ratio analysis is presented. The final section is the conclusion.

2. RELATED LITERATURE

Irrespective of rebuttals and endorsements about the objective of business, Garriga and Melé, (Garriga & Melé, 2004) suggests that social issues and profit objective must be integrated to enhance corporate success (Chan, Wang, & Raffoni, 2014). It is no longer a hear-say that there is a business sense in corporate social and environmental initiatives as it has been proven to be worth doing (Henri, Boiral & Roy, 2014); therefore, what is worth doing is worth measuring, sustainability accounting came into being to offer measurement support to sustainability management (Burritt, Hahn & Schaltegger, 2002). Consequently, eminent scholars have contributed significantly to improve accounting measurement for corporate social and environmental initiatives. These include inter alia, Kaplan & Bruns, 1987), Cooper & Kaplan, 1988) with an introduction of activity based costing (ABC) which has been used extensively in environmental management accounting; (Burritt & Schaltegger, 2001), Schaltegger & Burritt, (2014) developed ecological efficiency framework in corporate budgeting - a measurement for supply

chain sustainability performance. Furthermore Lee & Wu (2014) introduced a multidimensional measurement of environmental and economic performance; and Cintra, (2012) developed a simulation of environmental balance sheet. However, there are still a myriad of measurement gaps such as relating ecological cost management to firm's cost and operational efficiency, (Henri, Boiral, & Roy, 2016); Henri and colleagues posits that environmental cost performance needs to be linked to firm's cost structure and operational efficiency (Henri, Boiral, & Roy, 2016). This is important as managers are in need of "non-traditional data" and measurement system to guide sustainability strategic decisions (Collins, Lawrence, Roper & Haar, 2011, p.5; Henri, Boiral, & Roy, 2016). This may be addressed through an eco-ratio analysis - comparing environmental cost performance with firm's cost and operational efficiency; but the concept of eco-ratio analysis is currently absent in environmental management accounting literature and practice. To the best of authors' knowledge, eco-ratio analysis is still silent in academic, research and practice of environmental accounting. Therefore, this paper presents a suggestion for integrating 'eco-ratio analysis' into current environmental or sustainability accounting. This is a modest response to the suggestion by researchers such as Kolinski & Sliwczynski, (2015) and Hörisch Schaltegger & Windolph (2015) that contemporary customers and stakeholders, not only need information on environmental performance, they also need

information on the linkage between environmental performance and other business processes. Hence, the authors suggest that the desired linkage may, in addition to other measures, be through an 'eco-ratio analysis' that shows, at a glance, a specific environmental performance ratio relative to firm operations and investment. A proposed approach to eco-ratio analysis is presented in the following section and this initial suggestion provides an avenue for subsequent refinement by academics, researchers and practitioners.

3. SUGGESTED APPROACH TO ECO-RATIO ANALYSIS

Given the absence of 'Eco-Ratio Analysis' in current sustainability accounting literature and in practice, and considering the growing demand for more sustainability performance measurement, the authors present the following suggested 'Eco-Ratio Analysis' approach using a hypothetical company - Responsible Biz Ltd.

3.1. Eco-investment ratios in Responsible Biz Ltd. (a Hypothetical Company)

In this suggestion, yearly expenditure or costs incurred to enhance corporate sustainability initiatives are termed eco-investment and are related to firm's total investment, capital structure and revenue.

Table 1. Responsible Biz Ltd. Yearly Performance Figures with Suggested Eco-Ratios

Year	2014	2013	2012	2011	2010	2009
Performance	\$	\$	\$	\$	\$	\$
Total Assets	1000000	800000	600000	500000	400000	300000
Owner's Equity	600000	500000	400000	300000	200000	200000
Revenue	2000000	1800000	1600000	1400000	1200000	1000000
Eco-Expenses						
Energy Savings.Exp.	400 000	300 000	195 000	155 000	120 000	80 000
Waste Mgt Exp	400 000	300 000	188 000	150 000	90 000	64 000
Social. Exp.	105 000	120 000	130 000	134 000	120 000	110 000
Water Savings Exp.	380 000	280 000	190 000	150 000	110 000	60 000
Eco-Investment Ratio Analysis						
Eco-Exp. to Asset Ratio*						
Ener Savings.Exp.to Assets	4%	3.7%	3.3%	3.1%	3%	2.7%
Waste Mgt Exp to Assets	4%	3.8%	3.1%	3%	2.3%	2.1%
Soc. Exp. to Assets	1.1%	1.5%	2.2%	2.7%	3%	3.7%
Water Savings Exp.to Assets	3.8	3.5	3.2%	3%	2.8%	2%
Eco-Exp. to Equi Ratio						
EnerSavings.Exp.to Equity	6.7%	6%	4.9%	5.2%	6%	4%
Waste Mgt Exp To Equity	6.7%	6%	4.7%	5%	4.5%	3.2%
Soc. Exp. To Equity	1.8	2.4%	3.3%	4.5%	6%	5.5%
Water Savings Exp. To Equity	6.3%	5.6%	4.7	5%	5.5%	3%
Eco-Exp. to Rev Ratio						
EnerSavings.Exp.to Rev	20%	16.7%	12.2%	11.1%	10%	8%
Waste Mgt Exp to Rev.	20%	16.7%	11.8%	10.7%	7.5%	6.4%
Soc. Exp. to Rev.	5.3%	6.7%	8.13%	9.6%	10%	11%
Water Savings Exp.to Rev.	19%	15.6%	11.9%	10.7%	9.2%	6%

Source: authors' proposed Eco-Ratio Analysis Approach with hypothetical data for a hypothetical company (Responsible Biz Ltd). *Eco-Exp. to Asset Ratio = Eco-Expenditure / Asset

3.2. Eco-Profit ratios in Responsible Biz Ltd. (a Hypothetical Company)

In this suggestion, yearly savings derived from enhanced corporate sustainability initiatives are termed eco-profit and are related to firm's operating profit.

Table 2. Responsible Biz Ltd. Yearly Profit Performance Figures with Suggested Eco-Ratios

Year	2014	2013	2012	2011	2010	2009
Performance	\$	\$	\$	\$	\$	\$
Operating Profit	1200000	1120000	1100000	1000000	800 000	600 000
Eco-Savings						
Energy Savings Income	160 000	128 000	120 000	105 000	80 000	58 000
Water Savings Income	120 000	100 000	96 000	86 000	60 000	40 000
Eco-Income to Profit Ratio						
Energy Savings Income to Profit	13.3%	11.4%	10.9%	10.5%	10%	9.6%
Water Savings Income to Profit	10.00%	8.9%	8.73%	8.60%	7.50%	6.67%

Line Charts: Eco-Investment Performance Ratios
 for Responsible Biz Ltd 2010 - 2014

Figure 1. Line chart: Eco-Expenditure to Asset Ratios 2010 - 2014 Responsible Biz Ltd.

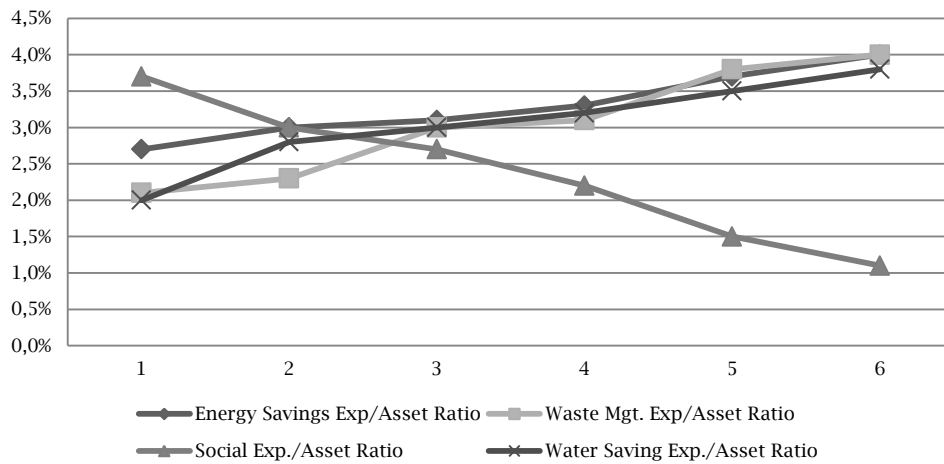


Figure 2. Line Chart: Eco-Expenditure to Equity Ratios 2010 - 2014 Responsible Biz Ltd.

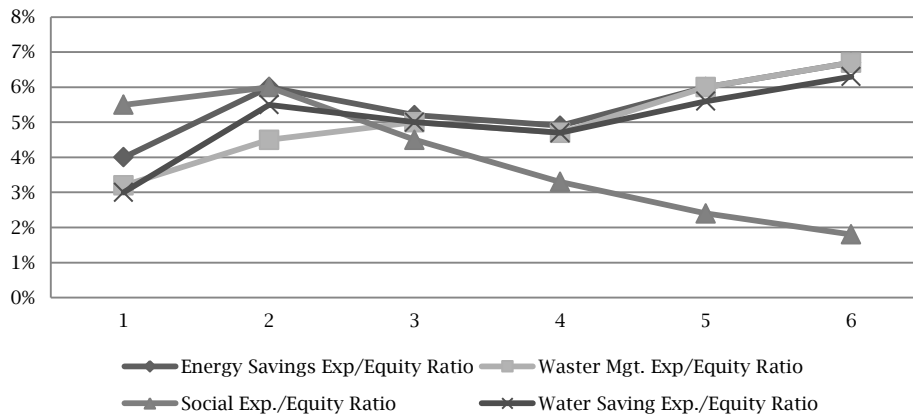
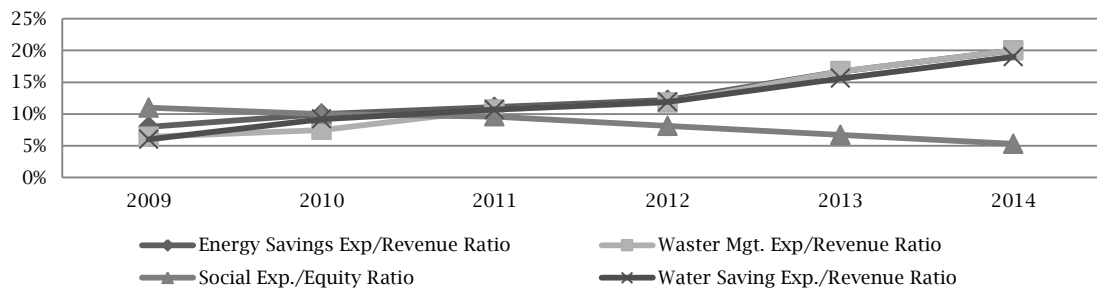


Figure 3. Line Chart: Eco-Expenditure to Revenue Ratios 2010 - 2014 Responsible Biz Ltd



The 2014 eco-investment performance ratios for Responsible Biz Ltd may be summed as:

$$[\Sigma En_{1-3} + \Sigma Wa_{1-3} + \Sigma So_{1-3} + \Sigma Wr_{1-3}] / 3 \quad (1)$$

where:

ΣEn_{1-3} = summation of Energy savings expenditure ratio for asset, equity and revenue;

ΣWa_{1-3} = summation of Waste Management expenditure ratio for asset, equity and revenue;

ΣSo_{1-3} = summation of Social expenditure ratio for asset, equity and revenue;

ΣWr_{1-3} = summation of Water savings expenditure ratio for asset, equity and revenue;

3 = three stratum (asset, equity and revenue).

The value derived from the above formula may therefore be regarded as the 2014 eco-ratio performance rating for Responsible Biz Ltd. This rating can thus be used to prepare an eco-performance industry comparison for related companies in the industry.

Therefore by including all the relevant corporate eco-activities not including in the preceding hypothetical illustration, and since the above suggestion are in sections or stratum, a company's eco-investment performance, say for two or more number of years could therefore be represented in a straight line relationship using a panel data regression as follows:

$$\gamma = \alpha + \beta_1 \chi_1 + \beta_2 \chi_2 + \beta_3 \chi_3 + \beta_4 \chi_4 + \beta_n \chi_n + \varepsilon \quad (2)$$

where:

γ = annual eco-ratio performance rating;

α = constant (γ intercept);

β_{1-n} = regression coefficient;

χ_{1-n} = environmental sustainability activity expenditure or eco-expenditure.

From the above suggested 'eco-ratio analysis' and concomitant production of annual data, academics, researchers and practitioners, may easily prepare a statistical estimation of a company's eco-performance rating. It will also produce a useful data for managers and responsible investors to extrapolate a company's sustainability performance.

4. CONCLUSION

This paper used a hypothetical firm - Responsible Biz Ltd to propose 'Eco-Ratio Analysis' as an additional measure of business sustainability performance. Since current practice and academic theory in sustainability management and accounting is yet silent about the concept of 'Eco-Ratio Analysis', the paper thus contributes a modest nuance to existing literature and practice in sustainability accounting. It is the authors' hope that this suggested measurement would attract further refinements, and may also spur academic and research agenda in theory and in practical case studies to apply 'Eco-Ratio Analysis' in single firms and in industry comparison for eco-performance. 'Eco-Ratio' trend analysis is significant, as it would provide a spot assessment of sustainability performance to management, investors, customers, stock exchanges, the government and diverse

stakeholders; it might also refocus business sustainability from being industry riveted to address wider ecological and social problems as suggested by (Whiteman, Walker & Perego, 2013). It will also contribute additional topic for classroom discussion in sustainability accounting lectures.

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