Assessing the Sustainability Ratios Reported by South African Companies

Heidi Janse van Rensburg[1,*], Miemie Struwig[2]

[1]Business School, Nelson Mandela University, Port Elizabeth, South Africa,
Orcid 0000-0001-9398-259X
[2]Department of Business Management, Nelson Mandela University, Port Elizabeth, South Africa,
Orcid 0000-0001-9318-183X

Keywords

Sustainability ratios
Integrated report
Financial context
Institutional theory

Abstract

This paper compares a proposed set of sustainability ratios over two periods. The intention is to evaluate whether the proposed set of sustainability ratios were indeed used in practice. For the study, a quantitative content analysis of the integrated reports of FTSE/JSE Responsible Investment Top 30 Index companies for the years 2017 and 2022 was performed using a systematic review. A total of 43 sustainability ratios were reported by the participating companies in 2017 and 2022. Ten reported ratios showed an increase in reporting frequency in 2022 compared to 2017.

The ratio with the highest reported frequency in 2022 was for women in management, followed by women in the workforce, historically disadvantaged South Africans in management, emission percentage change, water usage change, employee turnover and energy usage change. Trend ratios (namely, water, energy, emissions and waste) were reported in isolation without context. Some sustainability ratios proposed in theory were found to be in monetary values (for example, Emission cost / Sales), however, it was found in practice that similar ratios were presented in units (for example, Emissions tonnes / Revenue). The results confirmed that the proposed set of 43 sustainability ratios could be a starting point for a useable set of sustainability ratios.

*Corresponding Author
[1*] heidi.jansevanrensburg@mandela.ac.za
[2] Miemie.Struwig@mandela.ac.za

1. Introduction

Financial analysts observe and analyse various facets of a business to assess whether a business is financially sound to survive and grow in the business environment. Financial ratios are widely used tools for financial analysis (Kliestik, Vlaskova, Lazaroiu, Kovacova & Vrbka, 2020; Nadar & Wadhwa, 2019). Ratios act as a benchmarking and trend analysis tool by disclosing relationships as well as bases of comparison that reveal conditions and trends that cannot be detected by the individual components of the ratio. Financial ratios express relationships between the individual components of the ratio. Although they provide historical data, management can use ratios to identify internal strengths and weaknesses as well as identify patterns that will assist in estimating future financial performance as ratios are future-oriented (Bordeianu & Radu, 2022). Bubic, Cramon and Schubotz (2010:3) advocated that the relationship between different events, together with the context of occurrence, influence the strength of predictions. The relationship between sustainability indicators and financial amounts (as a basis from which to predict future cash flows) must be understood in the context of the assumptions underlying the present financial health of a company and with regard to external information.

Sustainability has become an important topic in any business (Gleißner, Günther & Walkshäusl, 2022). This means that businesses have responsibilities to society and the environment that extend beyond making a profit. Sustainability issues arise wherever there is a risk of irreversible loss of qualities of the environment or society that people value. Sustainability in a business can be pursued by actively managing and enhancing six types of assets, namely, (i) natural capital, (ii) human capital, (iii) social capital, (iv) intellectual capital, (v) manufactured capital and (vi) financial capital (IIRC, 2021:20). Sustainability is achieved by living off the income from these capitals rather than by degrading the capitals themselves.

For Singh, Murty, Gupta and Dikshit (2012:283), there is a widely recognised need for individuals, businesses and societies to find models, metrics and tools for articulating the degree to which, and the ways in which, current activities are sustainable. Castro and Chousa (2006:328) developed an integrated framework for the financial analysis of sustainability, and suggested that the Du Pont system for ratio analysis be applied to sustainability. The Du Pont model provides a structural break down of key ratios into component parts which enables the monitoring of each of the individual component ratios (Nader & Wadhwa, 2019). In addition, Castro and Chousa (2006) suggested that financial figures be used as denominators in calculating some sustainability ratios. According to Ngwakwe and Ambe (2016:516), the campaign for the financial analysis of sustainability has been heightened, and more measurement tools are needed that link environmental and social performance with other business operations. Ngwakwe and Ambe (2016) suggested that sustainability ratios should be expressed in monetary values (for example, energy savings expenditure/revenue) and proposed monetary ratios for the financial analysis of sustainability using denominators such as revenue, assets, equity and profit. Anywar (2019)

used a ten-step process to develop a proposed set of sustainability ratios that could be used to analyse sustainability performance of South African businesses. The framework by Anywar (2019) has not been tested in South Africa, nor in any other country.

This paper explores the financial analysis of sustainability using a two-phased approach. Firstly, a literature analysis was used to identify sustainability ratios. In phase two, these ratios were compared to reported ratios by the FTSE/JSE Responsible Investment Top 30 Index companies for years 2017 and 2022 to determine whether theoretical sustainability ratios were used in practice and whether they could be a possible set of sustainability ratios.

2. Problem investigated

Measuring tools regarding sustainability performance is required by businesses (Maciková, Smorada, Dorˇcák, Beug & Markoviˇc, 2018). Castro and Chousa (2006:322) identified a need for an integrated system of ratios that would consider the quantitive and qualitative, environmental accounting and non-accounting expressions as well as economic and social performances of businesses. Although different frameworks of sustainability assessment have been developed that evaluate the performance of businesses, these metrics and indicators can help determine progress towards sustainability only to a point (Blackburn, 2007:20). According to Ngwakwe and Ambe (2016) there are a myriad of measurement gaps and therefore the authors proposed eco-ratio analysis as an additional measure of business sustainability performance. However, current practice and academic theory in sustainability management and accounting is silent about the concept of eco-ratio analysis (Ngwakwe and Ambe, 2016). In a study by Anywar (2019), a set of 101 sustainability ratios were identified to analyse sustainability performance of South African listed companies. Whether these ratios are indeed usable needs to be tested. The framework by Anywar (2019) will be tested for the first time in this study.

3. Research objectives

The primary objective of this research was to assess the sustainability ratios that were reported by South African companies.

To assist in achieving the primary objective, the secondary objectives of this research were:

i. To analyse critically existing literature on financial analysis.

ii. To analyse critically existing literature on financial analysis of sustainability to identify theorical ratios to measure sustainability.

iii. To explore empirically and evaluate the sustainability ratios reported by South African companies and compare them to theoretical sustainability ratios.

iv. To propose a set of sustainability ratios.

4. Literature review

In section 4.1 Financial ratio analysis is outlined, followed by 4.2 Financial analysis of sustainability.

4.1 Financial ratio analysis

Financial ratio analysis assists users to draw conclusions concerning different aspects such as operational efficiency, profitability and financial health of a business. As a result, ratios have maintained an important position in the financial field as tools for making investment and lending decisions by banks and insurance companies (Sahu & Charan, 2013:38). Andrijasevic and Pasic (2014:118) identify two different ways in which ratios can be used as a comparison tool. Firstly, ratios could be used as trend analysis assessment tools in which one specific ratio would be compared over a period of time within a company. Secondly, ratios could be used as benchmarking tools for comparing the performance of companies within a similar industry at a specific moment in time. Furthermore, management can use ratios to identify internal strengths and weaknesses as well as identify patterns that will assist in estimating future financial performance (Bordeianu & Radu; 2022). Bubic et al. (2010:3) advocated that the relationship between different events, together with the context of occurrence, influenced the strength of predictions. Therefore, the relationship between financial amounts must be understood in the context of the assumptions underlying the present financial health of a company with regard to external information.

4.2 Financial analysis of sustainability

The link between financial analysis and sustainability has been investigated in theoretical and empirical studies by various researchers in areas such as corporate social responsibility (Weber, 2008), environmental performance (Koo, Chung & Ryoo, 2014; Wagner & Schaltegger, 2004) as well as sustainability performance (Wagner, 2010). However, with regard to financial analysis, studies mainly focused on the financial and economic performance of a company. Researchers such as Venanzi (2012), Burhan and Rahmanti (2012) as well as Aggarwal (2013), mainly focused on profitability indicator ratios (for example, ROA, ROE, PBT), while authors such as Jones (2005), Buys, Oberholzer and Andrikopoulos (2011) as well as Eccles, Ioannou and Serafeim (2012) combined both profitability and market indicators when attempting to find the relationship between sustainability and financial or economic performance of different companies.

The obligation of businesses in society has been a concern for both researchers and professionals for a long time (Salzmann, Ionescu-Somers & Steger, 2005:27). As a result, the literature has progressively stressed the importance of incorporating the sustainability concept into business models (Matos & Silvestre, 2013:61) with the emphasis on making a sustainable business, which intends to act pro-

actively in executing ecological and social practices (Hart & Milstein, 2003). Blackburn (2007:8) emphasises the importance of sustainability to a business by explaining how addressing key trends and issues of sustainability systematically can enhance business opportunities and protect it from the risks, reputational challenges and inefficiencies that destroy shareholder value.

The World Business Council for Sustainable Development (WBCSD, 1997), Organisation for Economic Co-operation and Development (OECD, 2002) and the Global Reporting Initiative (GRI, 2013) were the foundation for sustainability reporting. The aim of this reporting system was to help identify what was done to help achieve good results, presenting the path for success to others, both inside and outside the business. However, Blackburn (2007:20) states that these metrics and indicators can help determine progress towards sustainability, but only to a point. To bridge this potential gap in sustainability measurement, Castro and Chousa (2006) proposed adapting the existing Du Pont model of financial analysis and developing an integrated framework for the financial analysis to create sustainability-oriented value in companies. Ngwakwe and Ambe (2016:516) suggested eco-ratio analysis as an approach for measuring the link between environmental cost performances with cost structure and operational efficiency. Eco-ratio analysis is outlined in Table1.

Table 1: Eco-ratio analysis

ECO-EXPENDITURE TO ASSET RATIO
• Energy Savings Expenditure to Assets Ratio
• Waste Management Expenditure to Assets Ratio
• Social Expenditure to Assets Ratio
• Water Savings Expenditure to Assets Ratio
ECO-EXPENDITURE TO EQUITY RATIO
• Energy Savings Expenditure to Equity Ratio
• Waste Management Expenditure to Equity Ratio
• Social Expenditure to Equity Ratio
• Water Savings Expenditure to Equity Ratio
ECO-EXPENDITURE TO REVEUE RATIO
• Energy Savings Expenditure to Revenue Ratio
• Waste Management Expenditure to Revenue Ratio
• Social Expenditure to Revenue Ratio
• Water Savings Expenditure to Revenue Ratio
ECO-INCOME TO PROFIT RATIO
• Energy Savings Income to Profit Ratio
• Water Savings Income to Profit Ratio

Source: Ngwakwe and Ambe (2016)

Table 1 shows monetary ratios for the financial analysis of sustainability using denominators revenue, assets, equity and profit. Table 1 highlights the need to develop sustainability ratios that can assist in analysing and understanding the sustainability performance of companies. Anywar (2019) used a ten-step process to develop a proposed set of sustainability ratios that could be used to analyse sustainability performance of South African businesses. The framework by Anywar (2019) is outlined in Table 2.

Table 2: Sustainability ratios suggested by Anywar (2019)

Ratio	Ratio formulae	Source
Economic – 29 sustainability ratios **Economic sustainability ratios measure the relationship between the growth of a company and its ability to support future generations.**		
Worker Output Ratio	$\frac{Revenue}{Total\ Employees}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Revenue Per Energy Consumption Ratio	$\frac{Revenue}{Total\ Energy\ Consumed\ (GJ)}$	Castro and Chousa (2006)
Revenue Per Water Usage Ratio	$\frac{Revenue}{Total\ Water\ Used\ (Kl)}$	Castro and Chousa (2006)
Sustainability Efficiency Ratio	$\frac{Net\ Value\ Added}{Cost\ of\ Sustainable\ Capital}$	Figge and Hahn (2005)
Operating Profit Per Water Usage Ratio	$\frac{Operating\ Profit}{Total\ Water\ Used\ (Kl)}$	Reported
Operating Profit Per Energy Consumption Ratio	$\frac{Operating\ Profit}{Total\ Energy\ Consumed\ (GJ)}$	Reported
Corporate Citizenship Ratio	$\frac{Corporate\ Social\ Investment}{Operating\ Profit}$	Reported
Employee Productivity Ratio	$\frac{Operating\ Profit}{Total\ Employees}$	Reported
Recycling Strategy Ratio	$\frac{Cost\ of\ Adopting\ Recycling\ Strategies}{Net\ Profit}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Revenue Per Renewable Raw Material Ratio	$\frac{Revenue}{Total\ Renewable\ Raw\ Material\ (Kg)}$	Castro and Chousa (2006).
Revenue Per Non-Renewable Raw Material Ratio	$\frac{Revenue}{Total\ Non\ Renewable\ Raw\ Material\ (Kg)}$	Castro and Chousa (2006)
Revenue Per Waste Ratio	$\frac{Revenue}{Total\ Waste\ Produced\ (T)}$	Castro and Chousa (2006)
Revenue Per Emissions Ratio	$\frac{Revenue}{Total\ Emissions\ Emitted\ (T)}$	Castro and Chousa (2006)
Operating Profit Per Waste Ratio	$\frac{Operating\ Profit}{Total\ Waste\ Produced\ (T)}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Operating Profit Per	$\frac{Operating\ Profit}{}$	Calculated based on

Ratio	Ratio formulae	Source
Emissions Ratio	$\boldsymbol{Total\ Emissions\ Emitted\ (T)}$	sustainability indicators (GRI, 2013; Singh et al 2012)
Training Spend Per Employee Ratio	$\frac{\boldsymbol{Training\ Spend}}{\boldsymbol{Total\ Employees\ Trained}}$	Reported
Equity Per Employee Ratio	$\frac{\boldsymbol{Equity}}{\boldsymbol{Total\ Employees}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Value Added Per Employee Ratio	$\frac{\boldsymbol{Value\ Added}}{\boldsymbol{Total\ Employees}}$	Value Added Per Employee Ratio
Wealth Created Per Employee Ratio	$\frac{\boldsymbol{Wealth\ Created}}{\boldsymbol{Total\ Employees}}$	Reported
Wealth Created Per Share Ratio	$\frac{\boldsymbol{Wealth\ Created}}{\boldsymbol{Weighted\ Average\ Number\ of\ Shares}}$	Reported
Assets Per Employee Ratio	$\frac{\boldsymbol{Assets}}{\boldsymbol{Total\ Employees}}$	Reported
Sustainability Strategy Ratio	$\frac{\boldsymbol{Cost\ of\ Adopting\ Sustainability\ Strategies}}{\boldsymbol{Market\ Value}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Green Packaging Ratio	$\frac{\boldsymbol{Green\ Packaging\ Cost}}{\boldsymbol{Revenue}}$	Castro and Chousa (2006)
Green Innovation Ratio	$\frac{\boldsymbol{Green\ Innovation\ Cost}}{\boldsymbol{Revenue}}$	Castro and Chousa (2006)
Energy Investment Ratio	$\frac{\boldsymbol{Purchased\ Inputs}}{(\boldsymbol{Local\ Non\ Renewable\ Inputs} + \boldsymbol{Accounting\ for\ Local\ Renewable\ Energy\ Inputs})}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Return on Innovation Investment Ratio	$\frac{\boldsymbol{Profits\ or\ Cashflows\ Produced\ by\ Innovation}}{\boldsymbol{Cumulative\ Investement}}$	Scott (2013)
Innovation Success Rate Ratio	$\frac{\boldsymbol{Successful\ Sustainable\ Ideas}}{\boldsymbol{Total\ Sustainable\ Ideas\ Explored}}$	Scott (2013)
Innovation Magnitude Ratio	$\frac{\boldsymbol{Financial\ Contribution}}{\boldsymbol{Successful\ Sustainable\ Ideas}}$	Scott (2013)
Investment Efficiency Ratio	$\frac{\boldsymbol{Sustainable\ Ideas\ Explored}}{\boldsymbol{Total\ Capital\ \ Operational\ Investment}}$	Scott (2013)

Ratio	Ratio formulae	Source
ENVIRONMENTAL – Forty-five sustainability ratios **Environmental sustainability ratios measure a company's ability to preserve the environmental resources for future generations.**		
Energy Consumption Per Employee Ratio	$\frac{\textbf{Energy Consumed (GJ)}}{\textbf{Total Employees}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Water Usage Per Operating Profit Ratio	$\frac{\textbf{Water Used (Kl)}}{\textbf{Operating Profit}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Energy Consumption Per Operating Profit Ratio	$\frac{\textbf{Energy Consumed (GJ)}}{\textbf{Operating Profit}}$	Calculated based on sustainability indicators GRI, 2013; Singh et al 2012)
Production Per Employee Ratio	$\frac{\textbf{Saleable Production}}{\textbf{Total Employees}}$	Reported
Energy Consumption Per Production Ratio	$\frac{\textbf{Energy Consumed (GJ)}}{\textbf{Saleable Production}}$	Reported
Water Usage Per Production Ratio	$\frac{\textbf{Water Used (Kl)}}{\textbf{Saleable Production}}$	Reported
Water Usage Percentage Change Ratio	$\frac{(\textbf{Water Used Current Year} - \textbf{Water Used Prior Year})}{\textbf{Water Used (Kl) Prior Year}}$	Reported
Recycled Water Percentage	$\frac{\textbf{Recycled Water (Kl)}}{\textbf{Tatal Water Used (Kl)}}$	Reported
Water Usage Per Employee Ratio	$\frac{\textbf{Water Used (Kl)}}{\textbf{Total Employees}}$	Reported
Water Usage Per Revenue Ratio	$\frac{\textbf{Water Used}}{\textbf{Revenue}}$	Castro and Chousa (2006).
Energy Consumption Percentage Change Ratio	$\frac{(\textbf{Energy Consumed Current Year} - \textbf{Energy Consumed Prior Year})}{\textbf{Energy Consumed (GJ) Prior Year}}$	Reported
Water Saved Percentage	$\frac{\textbf{Water Saved (Kl)}}{\textbf{Total Water Withdrawn (Kl)}}$	Reported
Energy Consumption Per Revenue Ratio	$\frac{\textbf{Energy Consumed cost}}{\textbf{Revenue}}$	Castro and Chousa (2006)

Ratio	Ratio formulae	Source
Eco-Cost Energy Ratio	$\frac{\textbf{Renewable Energy Cost}}{\textbf{Revenue}}$	Castro and Chousa (2006)
Water Purification Ratio	$\frac{\textbf{Cost of Water Purification}}{\textbf{Operating Profit}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Recycled Material Ratio	$\frac{\textbf{Recycled Material Cost}}{\textbf{Revenue}}$	Ngwakwe and Ambe (2016)
Waste Management Ratio	$\frac{\textbf{Waste Management Cost}}{\textbf{Operating Profit}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Water Expense Ratio	$\frac{\textbf{Water Savings Expenditure}}{\textbf{Revenue}}$	Ngwakwe and Ambe (2016)
Energy Savings Ratio	$\frac{\textbf{Energy Savings Expenditure}}{\textbf{Revenue}}$	Ngwakwe and Ambe (2016)
Raw Material Consumption Cost Per Kg Ratio	$\frac{\textbf{Raw Material Consumption Cost}}{\textbf{Kg Raw Material}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Energy Consumption Cost Per GJ Ratio	$\frac{\textbf{Energy Consumption Cost}}{\textbf{GJ Energy Consumed}}$	Castro and Chousa (2006)
Emissions Per Equity Ratio	$\frac{\textbf{Total Emissions Emitted (T)}}{\textbf{Equity}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Waste Per Equity Ratio	$\frac{\textbf{Total Waste Produced (T)}}{\textbf{Equity}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Waste Per Operating Profit Ratio	$\frac{\textbf{Total Waste Produced (T)}}{\textbf{Operating Profit}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Waste Per Employee Ratio	$\frac{\textbf{Total Waste Produced (T)}}{\textbf{Total Employees}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Waste Per Revenue Ratio	$\frac{\textbf{Waste Produced}}{\textbf{Revenue}}$	Ngwakwe and Ambe (2016)
Emission Per Production Ratio	$\frac{\textbf{Total Emissions Emitted (T)}}{\textbf{Saleable Production}}$	Singh et al (2012)

Ratio	Ratio formulae	Source
Emissions Percentage Change Ratio	$\frac{(\boldsymbol{Emissions\ Emitted\ Current\ Year} - \boldsymbol{Emissions\ Emitted\ Prior\ Year})}{\boldsymbol{Emissions\ Emitted}\ (\boldsymbol{T})\boldsymbol{Prior\ Year}}$	Reported
Emission Per Employee Ratio	$\frac{\boldsymbol{Total\ Emissions\ Emitted}\ (\boldsymbol{T})}{\boldsymbol{Total\ Employees}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Emission Per Square Metre Office Space Ratio	$\frac{\boldsymbol{Total\ Emissions\ Emitted}\ (\boldsymbol{T})}{\boldsymbol{Square\ Metre\ Office\ Space}}$	Reported
Emission Per Revenue Ratio	$\frac{\boldsymbol{Total\ Emissions\ Emitted}\ (\boldsymbol{T})}{\boldsymbol{Revenue}}$	Castro and Chousa (2006)
Emission Per Operating Profit Ratio	$\frac{\boldsymbol{Total\ Emissions\ Emitted}\ (\boldsymbol{T})}{\boldsymbol{Operating\ Profit}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Recycled Waste Percentage	$\frac{\boldsymbol{Recycled\ Waste}\ (\boldsymbol{T})}{\boldsymbol{Total\ Waste\ Produced}}$	Reported
Waste Percentage Change Ratio	$\frac{(\boldsymbol{Waste\ Produced\ Current\ Year} - \boldsymbol{Waste\ Produced\ Prior\ Year})}{\boldsymbol{Waste\ Produced}\ (\boldsymbol{T})\boldsymbol{Prior\ Year}}$	Reported
Non-Renewable Energy Cost Ratio	$\frac{\boldsymbol{Total\ Non\ Renewable\ Inputs}}{\boldsymbol{Accounting\ for\ Local\ Renewable\ Energy\ Inputs}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Harmful Emissions Cost Ratio	$\frac{\boldsymbol{Harmful\ Emissions\ Reduction\ Cost}}{\boldsymbol{Revenue}}$	Castro and Chousa (2006)
Emissions Cost Ratio	$\frac{\boldsymbol{Emisssions\ Cost}}{\boldsymbol{Revenue}}$	Castro and Chousa (2006)
Emissions Cost Per Tonne Ratio	$\frac{\boldsymbol{Emissions\ Cost}}{(\boldsymbol{T})\ \boldsymbol{Emissions\ Emitted}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Waste Value Per Tonne Ratio	$\frac{\boldsymbol{Waste\ Value}}{(\boldsymbol{T})\ \boldsymbol{Waste\ Produced}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Environmental Fines Ratio	$\frac{\boldsymbol{Environmental\ Fines}}{\boldsymbol{Revenue}}$	Castro and Cousa (2006)

Ratio	Ratio formulae	Source
Water Usage Per Equity Ratio	$\frac{\textbf{Total Water Used (Kl)}}{\textbf{Equity}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Energy Consumption Per Equity Ratio	$\frac{\textbf{Total Energy Consumed (GJ)}}{\textbf{Equity}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Waste Management Expense to Equity Ratio	$\frac{\textbf{Waste Management Expenditure}}{\textbf{Equity}}$	Ngwakwe and Ambe (2016)
Energy Savings Expense to Equity Ratio	$\frac{\textbf{Energy Savings Expenditure}}{\textbf{Equity}}$	Ngwakwe and Ambe (2016)
Water Savings Expense to Equity Ratio	$\frac{\textbf{Water Savings Expenditure}}{\textbf{Equity}}$	Ngwakwe and Ambe (2016)
SOCIAL – Twenty-seven sustainability ratios **Social sustainability ratios measure the relationship between the company and its various stakeholder groups.**		
Employee Cost Ratio	$\frac{\textbf{Total Salary Cost}}{\textbf{Total Employees}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Social Ratio	$\frac{\textbf{Total Salary Cost}}{\textbf{Revenue}}$	Ngwakwe and Ambe 2016
Training Investment Per Worker Output Ratio	$\frac{\textbf{Training Investment}}{\textbf{Worker Output}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Training Investment Per Payroll Ratio	$\frac{\textbf{Training Investement}}{\textbf{Payroll}}$	Reported
TRCFR Per (X) Man Hours Worked Ratio	$\frac{(\textbf{Number of Fatalities} + \textbf{Lost Work Days} + \textbf{Restriced Work Injuries} + \textbf{Medical Treatement Cases})}{(X)\textbf{Employee Hours Worked}}$	Reported
LTIFR Per (X) Man Hours Worked Ratio	$\frac{\textbf{Lost Work Days Due to Work Injury}}{(X)\textbf{Employee Hours Worked}}$	Reported
FIFR Per (X) Man Hours Worked Ratio	$\frac{\textbf{Total Fatal Injuries}}{(X)\textbf{Employee Hours Worked}}$	Reported

Ratio	Ratio formulae	Source
Occupational Disease Per (X) Man Hours Worked Ratio	$\frac{\textbf{Total Occupational Diseases } (X)}{\textbf{Employee Hours Worked}}$	Reported
Grievances Per Employee Ratio	$\frac{\textbf{Grievances}}{\textbf{Total Employees}}$	Reported
Disciplinary Cases Per Employee Ratio	$\frac{\textbf{Disciplinary Cases}}{\textbf{Total Employees}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
TRCFR Per Full-Time Employees Ratio	$\frac{(\textbf{Number of Fatalities} + \textbf{Lost Work Days} + \textbf{Restriced Work Injuries} + \textbf{Medical Treatement Cases})}{\textbf{Full Time Equivalnt Employees}}$	Reported
Occupational Health & Safety Ratio	$\frac{\textbf{Total Occupational Health Safety Cost}}{\textbf{Number of Target Employees}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Target Employee Ratio	$\frac{\textbf{Employee Cost}}{\textbf{Employment Cost}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
CSI Expense to Equity Ratio	$\frac{\textbf{Corporate Social Investment}}{\textbf{Equity}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Target Customer Ratio	$\frac{\textbf{Revenue}}{\textbf{Total Target Customers}}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)
Women in Workforce Ratio	$\frac{\textbf{Women Employees}}{\textbf{Total Employees}}$	Reported
Employee Turnover Ratio	$\frac{\textbf{Total Terminated Employees}}{\textbf{Total Current Employees}}$	Reported
Women in Management Ratio	$\frac{\textbf{Women in Management}}{\textbf{Total Management Employees}}$	Reported
HDSAs in Management Ratio	$\frac{\textbf{HDSAs in Management}}{\textbf{Total Management Employees}}$	Reported
Black (AIC) Owned Suppliers Ratio	$\frac{\textbf{African}, \textbf{Indian}, \textbf{Coloured Suppliers}}{\textbf{Total Suppliers}}$	Reported

Ratio	Ratio formulae	Source
Black (AIC) Women Owned Suppliers Ratio	$\frac{African, Indian, Coloured\ Women\ Suppliers}{Total\ Suppliers}$	Reported
Women Employees Trained Ratio	$\frac{Women\ Employees\ Trained}{Total\ Employees\ Trained}$	Reported
Black (AIC) Employees Trained Ratio	$\frac{African, Indian, Coloured\ Employees\ Trained}{Total\ Employees\ Trained}$	Reported
Customer Satisfaction Ratio	$\frac{Satisfied\ Customers}{Total\ Customers}$	Reported
Disabled Employees Ratio	$\frac{Disabled\ Employees}{Total\ Employees}$	Reported
Black (AIC) Employees Ratio	$\frac{African, Indian, Coloured\ Employees}{Total\ Employees}$	Reported
Child Labour Fines Ratio	$\frac{Child\ Labour\ Fines}{Value\ Added}$	Calculated based on sustainability indicators (GRI, 2013; Singh et al 2012)

Source: Anywar (2019:285-299)

Table 2 shows a set of 101 sustainability ratios developed by Anywar (2019) using a ten-step process. In Step 1 secondary research in the form of a literature review was conducted. The critically evaluated secondary literature sources were used to create a theoretical framework of sustainability ratios as well as 'schedule for content analysis' containing indicators for sustainability. In Step 2 sustainability reports were analysed to obtain the indicators for sustainability indicated in the 'schedule of content analysis'. Thereafter, sustainability ratios were calculated by the researcher using the indicators obtained from the document analysis (Step 3). Sustainability ratios reported by the participating companies that were not covered by the developed theoretical framework were identified (Step 4). Descriptive statistical techniques were then used to analyse the document analysis results (Step 5). In Step 6, the results from the statistical analysis were categorised into sustainability ratios that were (i) calculated, (ii) not calculated and (iii) reported. Thereafter, a set of criteria were used to test the usability, relevance, measurability, understandability and comparability of the sustainability ratios proposed in the theoretical framework (Step 7). Additional criteria were then used to select sustainability ratios that should be included in the set of sustainability ratios (Step 8). Lastly, the sustainability ratios that were omitted as well as those that were included proposed set of sustainability ratios were highlighted (Step 9). Step 10 represented the outcome of the study, a set of 101 sustainability ratios was proposed.

The sustainability ratios in Table 2 were grouped under the three main aspects of sustainability, namely,

economic (n=29), environmental (n=45) and social (n=27). The financial analysis of sustainability was encouraged via various financial (monetary) amounts used to express a meaningful relationship between the individual components of the ratio. Interesting, 32 of the ratios suggested by Anywar (2019) used a financial (monetary) denominator to express a meaningful relationship. This set was used as a schedule for content analysis to evaluate integrated reporting consisting of the sustainability ratios reported by participating companies in 2017 and 2022.

5. Research methodology

A quantitative content analysis of integrated reports of FTSE/JSE Responsible Investment Top 30 Index companies was performed. The index assesses companies by a set of standards, which are disclosed to come up with a benchmark. The FTSE/JSE Responsible Investment Top 30 Index series benchmark was chosen because it represented a catalyst for best practice sustainability reporting among South African listed companies. It was expected that the integrated reports of these companies should be comprehensive as they are regarded as the Top 30 best sustainable companies in South Africa. The population is all JSE listed companies and these Top 30 companies were selected as the sample for this research using a purposive sampling method.

A systematic review of the integrated reports of South African companies using a schedule of content analysis was utilised to ensure uniformity in the information collected. The schedule for content analysis used to evaluate integrated reporting consisted of the sustainability ratios reported by participating companies in 2017 and 2022. The Top 30 companies' names were downloaded from the FTSE/JSE Responsible Investment Top 30 Index on 18 December 2017 and 1 June 2023 (https://www.jse.co.za), and the empirical survey yielded results from each list of Top 30 companies' integrated reports for the 2017 and 2022 financial year.

6. Results/Findings

In Sections 6.1 and 6.2, the results of the biographic information and analysis of reported ratios are outlined.

6.1 Analysis of biographic information

The Top 30 companies' names were downloaded from the FTSE/JSE Responsible Investment Top 30 Index on 18 December 2017 and 1 June 2023 (https://www.jse.co.za), and each list of 30 companies were categorised, according to industry. Table 3 summarises the industries included in this research.

Table 3: Frequency distribution: Industry

	2017	2017	2022	2022
Industry	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Basic Materials	12	40%	11	37%
Industrial	1	3%	2	7%
Consumer Goods	2	7%	2	7%
Healthcare	2	7%	2	7%
Consumer Services	4	13%	3	10%
Telecommunication	2	7%	1	3%
Financial	7	23%	8	26%
Technology	0	-	1	3%
	n=30		n=30	

Source: Researchers' own compilation

Table 3 shows that the highest percentage of companies operated in the basic materials industry (2022=37%; 2017=40%), followed by the financial industry (2022=26%; 2017=23%) and consumer goods industry (2022=10%; 2017=13%). The empirical survey yielded results from each list of Top 30 companies.

6.2 Analysis of reported ratios

Considering the various theoretical sustainability ratios outlined in Table 2, it was important to consider whether these ratios were indeed used in practice. Table 4 provides an overview of the different ratios found in each list of Top 30 companies' integrated reports for the 2017 and 2022 financial year.

Table 4: Results of the reported sustainability ratios

REPORTED SUSTAINABILITY RATIOS	COUNT (2017)	COUNT (2022)	CHANGE IN USE OF RATIOS	MONETARY AMOUNTS ONLY
ECONOMIC				
1) Worker output ratio	n=2	n=0	-	
2) Corporate citizenship	n=2	n=3	+	X
3) Employee productivity	n=2	n=0	-	
4) Production per employee	n=2	n=2	0	
5) Wealth created per employee	n=2	n=0	-	
6) Wealth created per share	n=2	n=0	-	
ENVIRONMENTAL				
Water				
7) Water usage % change	n=4	n=10	+	
8) Water usage (Kl) per revenue	n=2	n=1	-	

9) Water usage (Kl) per employee	n=1	n=1	0	
10) Water usage (Kl) per saleable production	n=4	n=2	-	
11) Water % recycled	n=1	n=2	+	
Energy				
12) Energy % change	n=3	n=6	+	
13) Energy consumption (Gj) per revenue	n=2	n=2	0	
14) Energy consumption (Gj) per saleable production	n=4	n=3	-	
15) Renewable energy % used	n=1	n=1	0	
Emissions				
16) Emissions % change	n=8	n=13	+	
17) Emissions (T) per revenue	n=3	n=1	-	
18) Emissions (T) per operating profit	n=1	n=0	-	
19) Emissions (T) per employee	n=3	n=1	-	
20) Emissions (T) per saleable production	n=6	n=5	-	
21) Emissions (T) per square metre office space	n=2	n=1	-	
Waste				
22) Waste % change	n=1	n=3	+	
23) Waste (T) recycled %	n=1	n=2	+	
SOCIAL				
24) Training investment per payroll	n=6	n=3	-	X
25) Training spent per employee	n=2	n=1	-	
26) TRCFR (Total Reportable Case Frequency Rate) per (X) man hours worked	n=9	n=6	-	
27) LTIFR (Lost Time Injuries Frequency Rate) per (X) man hours worked	n=10	n=5	-	
28) FIFR (Fatality Injury Frequency Rate) per (X) man hours worked	n=7	n=5	-	
29) TRCFR per full-time employee	n=1	n=0	-	
30) Occupational disease per (X) man hours worked	n=3	n=0	-	
31) Grievances per employee	n=1	n=1	-	

32) Disciplinary cases per employee	n=1	n=1	-	
33) Employee turnover ratio	n=17	n=8	-	
34) Women in management ratio	n=17	n=18	+	
35) Women in workforce ratio	n=23	n=11	-	
36) Women trained ratio	n=1	n=1	0	
37) HDSAs (Historically Disadvantaged South Africans) in management	n=9	n=11	+	
38) Black (African, Indian, Coloured) employees ratio	n=12	n=4	-	
39) Black (African, Indian, Coloured) employees trained	n=4	n=2	-	
40) Black (African, Indian, Coloured) women owned suppliers	n=2	n=0	-	
41) Black (African, Indian, Coloured) owned suppliers	n=5	n=0	-	
42) Disabled employees ratio	n=2	n=2	0	
43) Customer satisfaction	n=2	n=0	-	

Source: Researchers' own compilation

Table 4 shows that 43 sustainability ratios that were reported by the FTSE/JSE Responsible Investment Top 30 Index in 2017 and 2022. Only ten reported ratios showed an increase in frequency in 2022 compared to 2017. These included (i) corporate citizenship ratio, (ii) water usage % change, (iii) water % recycled, (iv) energy % change, (v) emissions % change, (vi) waste % change, (viii) waste recycled %, (ix) women in management and (x) HDSAs (Historically Disadvantaged South Africans) in Management.

The ratio with the highest reported frequency in 2022 was women in management (n=18), followed by women in workforce (n=11), HDSA in management (n=11), emissions % change (n=13), water usage change (n=10), employee turnover (n=8) and energy % change (n=6). It was noted that the trend ratios (water, energy, emissions and waste) were reported in isolation without context. For example, Nedbank reported "*Electricity down by 10%"* and "*Water down by 7%*" (Nedbank, 2022:10). Yet 62 pages further, the company reported that "*Permanent employees declined by 11%"* and "*Total floor space declined by 24%"* (Nedbank, 2022:72). The decline in water and electricity were not directly linked to the reduction in total floor space and the reduction in employees in the integrated report. Only one company, namely, ABSA bank, reported emissions as a percentage of square metres of office space, as well as emissions as a percentage of full-time employee (ABSA, 2022:22).

The sustainability ratios proposed in theory were found to be in monetary values (for example, Emission cost / Sales) while, in practice, similar ratios were presented in units (for example, Emissions tonnes / Revenue). Furthermore, only two of the reported ratios used only monetary amounts to express a

meaningful relationship. It was found that companies preferred to present sustainability ratios in units (energy, water usage) rather than monetary amounts (expenditure).

7. Proposed set of sustainability ratios

Considering the set of 101 sustainability ratios, only 43 of these were reported by the FTSE/JSE Responsible Investment Top 30 Index companies in years 2017 and 2022 with a total of six economic ratios (6/29), 17 environmental ratios (17/45) and 20 social ratios (20/27). Table 5 outlines a set of 43 reported sustainability ratios proposed by this paper.

Table 5: Proposed set of sustainability ratios

REPORTED SUSTAINABILITY RATIOS
ECONOMIC
1) Worker output ratio (Revenue per employee)
2) Corporate citizenship (Corporate social investment / Operating profit)
3) Employee productivity (Operating profit / Total employees)
4) Production per employee
5) Wealth created per employee
6) Wealth created per share
ENVIRONMENTAL
Water
7) Water usage % change
8) Water usage (Kl) per revenue
9) Water usage (Kl) per employee
10) Water usage (Kl) per saleable production (tonne milled, registered hospital bed)
11) Water % recycled
Energy
12) Energy % change
13) Energy consumption (Gj) per revenue
14) Energy consumption (Gj) per saleable production (tonne milled, registered hospital bed)
15) Renewable energy % used
Emissions
16) Emissions % change
17) Emissions (T) per revenue
18) Emissions (T) per operating profit
19) Emissions (T) per employee
20) Emissions (T) per saleable production (tonne milled, registered hospital bed)
21) Emissions (T) per square meter office space
Waste
22) Waste % change
23) Waste (T) recycled %
SOCIAL
24) Training investment per payroll
25) Training spent per employee
26) TRCFR (Total Reportable Case Frequency Rate) per (X) man hours worked
27) LTIFR (Lost Time Injuries Frequency Rate) per (X) man hours worked
28) FIFR (Fatality Injury Frequency Rate) per (X) man hours worked
29) TRCFR per full-time employee
30) Occupational disease per (X) man hours worked
31) Grievances per employee

32) Disciplinary cases per employee
33) Employee turnover ratio
34) Women in management ratio
35) Women in workforce ratio
36) Women trained ratio
37) HDSAs (Historically Disadvantaged South Africans) in management
38) Black (African, Indian, Coloured) employees ratio
39) Black (African, Indian, Coloured) employees trained
40) Black (African, Indian, Coloured) women owned suppliers
41) Black (African, Indian, Coloured) owned supplier
42) Disabled employees ratio
43) Customer satisfaction

Source: Researchers' own compilation

Table 5 shows 43 ratios that were reported by listed companies on the FTSE/JSE Responsible Investment Top 30 Index. The ratio production per employee was categorised as an economic ratio (not environmental) for the purpose of this paper. Furthermore, saleable production would include indicators such as number of beds, tonnes treated and tonnes milled.

8. Practical managerial implications and recommendations

Only 43 of the 101 sustainability ratios suggested by theory were reported in practice. This indicated that what happening in theory was not yet occurring in practice. In theory, ratios were found to be in monetary values (for example, Emission cost / Sales) while, in practice, similar ratios were presented in units only (for example, Emission tonnes / Revenue). Therefore, it is recommended that more research should be conducted to develop theory around sustainability ratios. In particular, a set of proposed sustainability ratios are still required. Such a set of proposed sustainability ratios could be an additional tool to help companies evaluate their sustainability performance. The proposed set can be a starting point for companies to link environmental and social performance with other business operations. Although the proposed set presents ratios expressed in units, it will assist companies in measuring their sustainability performance.

The institutional theory suggests that pressures in the institutional environment cause businesses to imitate and conform, in other words, businesses start to look similar (Scott, 1988). In fear of being singled out, businesses become isomorphic with other successful businesses (Gomes, 2006:81). Transferred to the domain of sustainability, integrated reporting will gradually align owing to institutional isomorphism (Hahn & Kuhnen, 2013:10; Brown, de Jong & Levy, 2009:571). In other words, according to the institutional theory, the use and disclosure of sustainability ratios will be consistent with what others do (imitation), past practice of the firm (routine) and regulations, laws and customs (institutions). As sustainability ratios over time are compared in this research, it is proposed that future research also includes whether companies are indeed following what others do as suggested by the institutional theory.

The evaluation of the sustainability ratios in this research was limited to public companies, listed on the

FTSE/JSE Responsible Investment Top 30 Index. Small- and medium-sized businesses, which included private (non-listed) companies, were not evaluated and this was, therefore, recognised as a limitation to the scope of this research. In other words, the set of sustainability ratios for application by small- and medium-sized businesses were not addressed in this research. The lack of previous research studies in the area of sustainability ratios and their limited practical use show the importance to develop a usable set of sustainability ratios.

Conclusions

Sustainability has become a significant social movement that aims to transform radically how businesses understand and create value (Robins, 2012:348). Thus, the need to measure sustainability performance is becoming important in various industries. Measuring sustainability performance is considered important, if the measuring tool used could determine whether a business is moving in the right direction both strategically and financially. As a result, this paper identified the lack of a proper set of sustainability ratios that could be used to determine the efficient and effective performance of the sustainability strategies implemented by the public listed companies in South Africa. A proposed set of sustainability ratios were tested to be usable and could be employed as a starting point. Therefore, this research is also starting to indicate the need to implement sustainability strategies.

REFERENCES

ABSA. (2022). ABSA Group Limited Integrated Report Available from: https://www.absa.africa/wp-content/uploads/2023/03/2022-Absa-Group-Limited-Integrated-Report.pdf. [Accessed on 01.06.2023].

Aggarwal, P. (2013). Impact of sustainability performance of company on its financial performance: A study of listed Indian companies. *Global Journal of Management and Business Research*, 13(11):61-70.

Andrijasevic, M. & Pasic, V. (2014). A blueprint of ratio analysis as information basis of corporation financial management. *Problems of Management in 21st Century*, 9(2):117-123.

Anywar, A. (2019). *The development of sustainability ratios for public listed companies*. Doctoral thesis, Nelson Mandela University.

Arkan, T. (2016). The importance of financial ratios in predicting stock price trends: A case study in emerging markets. *Finanse, Rynki Finansowe, Ubezpieczenia*, 1(79):13–26.

Blackburn, R.W. (2007). The sustainability handbook. USA & UK: Earthscan.

Bordeianu, G.D. & Radu, F. (2022). Basic types of financial ratios used to measure a company's performance. *Economy Transdisciplinarity Cognition*, 23(2):53-58.

Brown, H.S., De Jong, M. & Levy, D.L. (2009). Building institutions based on information disclosure: lessons from GRI's sustainability reporting. *Journal of Cleaner Production*, 17:571-580.

Bubic, A., von Cramon, D.Y. & Schubotz, R.I. (2010). Prediction, cognition and the brain. *Frontiers in Human Neuroscience*, 4(25):1-15.

Burhan, N.A.H. & Rahmanti, W. (2012). The impact of sustainability reporting on company performance. *Journal of Economics, Business, and Accountancy*, 15(2):257-272.

Buys, P., Oberholzer, M. & Andrikopoulos, P. (2011). An investigation of the economic performance of sustainability reporting companies versus non-reporting companies: A South African perspective. *Journal of Social Sciences*, 29(2):151-158.

Castro, R.N. & Chousa, P.J. (2006). An integrated framework for the financial analysis of sustainability.

Business Strategy and Environmental, 15:322-333.

Eccles, R.G., Ioannou, I. & Serafeim, G. (2012). The impact of a corporate culture of sustainability on corporate behaviour and performance. *Harvard Business School, Working Paper 12-035*, May.

Figge, F. & Hahn, T. (2005). The cost of sustainability capital and the creation of sustainable value by companies. *Journal of Industrial Ecology*, 9 (4):47-58.

Gleißner, W., Günther, T. & Walkshäusl, C. (2022). Financial sustainability: Measurement and empirical evidence. *Journal of Business Economics,* 92:467-516.

Gomes, R.C. (2006). Stakeholder management in the local government decision-making area: Evidence from a triangulation study with the English local government. *Revista de Administragao Contemporanea*, 11(1):75-95.

GRI. (2013). Global Reporting Initiative version G4. Sustainability Reporting Guidelines: Reporting principles and standard disclosures. Boston, MA.

Hart, S.L. & Milstein, M.B. (2003). Creating sustainable value. *Academy of Management Executive,* 17(2):56-69.

Hahn, R. & Kuhnen, M. (2013). Determinants of sustainability reporting: A review of results, trend, theory and opportunities in an expanding field of research. *Journal of Cleaner Production*,1-17.

IIRC (International Integrated Reporting Council). (2020). Integrate Reporting.
IIRC (International Integrated Reporting Council). (2021). Integrate Reporting.

Jones, S. (2005). Notes of the University of Sydney Pacioli Society. *Abacus*, 41(2):211-216.

Kliestik, T., Vlaskova, K., Lazaroiu, G., Kovacova, M. & Vrbka, J. (2020). Remaining financially healthy and competitive: The role of financial predictors. *Journal of Competitiveness*, 12(1), 74-92.

Koo, C., Chung, N. & Ryoo, S.Y. (2014). How does ecological responsibility affect manufacturing firms' environmental and economic performance? *Total Quality Management & Business Excellence*, 25(9-10):1171-1180.

Maciková, N., Smorada, M., Dorˇcák, P., Beug, B. & Markoviˇc, P. (2018). Financial aspects of sustainability: An evidence from Slovak companies. *Sustainabilit*y, 10(2274): 1-15.

Matos, S. & Silvestre, B.S. (2013). Managing stakeholder relations when developing sustainable business models: The case of the Brazilian energy sector. *Journal of Cleaner Production*, 45:61-73.

Nadar, D. S. & Wadhwa, B.W. (2019). Theoretical Review of the Role of Financial Ratios *The Social Science Research Network*. Available at SSRN: https://ssrn.com/abstract=3472673 or http://dx.doi.org/10.2139/ssrn.3472673

Nedbank. (2022). *Nedbank Group Limited Integrated Report.* Available from: https://www.nedbank.co.za/content/nedbank/desktop/gt/en/investor-relations/information-hub/integrated-reporting/2022.html. [Accessed on 01.06.2023].

Ngwakwe, C.C. & Ambe, M.C. (2016). Business sustainability performance measurement: Eco-ratio analysis. *Risk Governance & Control: Financial Markets & Institutions,* 6(4):516-520.

OECD. (2002). Organisation for Economic Co-operation and Development. Glossary of key terms in evaluation and result based management. *DAC Working Party on Aid Evaluation*. Paris, France.

Robins, N. (2012). *Green II*. Johannesburg: SAICA.

Sahu, P.A. & Charan, P. (2013). Ratio analysis is an instrument for decision making: A study. *Asian Pacific Journal of Research*, I(VIII):36-41.

Salzmann, O., Ionescu-Somers, A. & Steger, U. (2005). The business case for corporate sustainability: Literature review and research options. *European Management Journal*, 23(1):27-36.

Scott, A. (2013). How to really measure a company's innovation prowess. *Harvard Business Review*, March 21: Innosight. Available at https://hbr.org/2013/03/how-to-really-measure-a-compan [Accessed on: 12.03.2018]

Scott, W.R. (1998). The adolescence of institutional theory. *Administrative Science Quarterly*, 32(4):493-511.

Singh, K.R., Murty, H.R., Gupta, S.K. & Dikshit, A.K. (2012). An overview of sustainability assessment methodologies. *Ecological Indicators*, 15(1):281-299.

Skiera, B., Bermes, M. & Horn, L. (2011). Customer equity sustainability ratio: A new metric for assessing a firm's future orientation. *Journal of Marketing*, 75(3):118-131.

Venanzi, D. (2012). Social ratings and financial performance: An instrumental approach. Available at SSRN 2188859.

Vogtlander, J.G., Brezet, H.C. & Hendriks, C.F. (2001). The virtual eco-costs '99, a single LCA-based indicator for sustainability and the eco-costs / Value Ratio (EVR) model for economic allocation. *Int. J. LCA*, 6(3):157-166.

Wagner, M. (2010). The role of corporate sustainability performance for economic performance: A firm-level analysis of moderation effects. *Ecological Economics*, 69:1553-1560.

Wagner, M. & Schaltegger, S. (2004). The effect of corporate environmental strategy choice and environmental performance on competitiveness and economic performance: An empirical study of EU manufacturing. *European Management Journal*, 22(5):557-572.

WBCSD. (1997). World Business Council for Sustainable Development. *Signals of change*. *Business progress toward sustainable development*. Geneva, Switzerland.

Weber, M. (2008). The business case for corporate social responsibility: A company-level measurement approach for CSR. *European Management Journal*, 26:247-261.