Corporate Sustainability Performance Measurement – Suggestions for quantitative research

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Abstract

In the last 20 years, different reporting models related to sustainability performance have been developed and used as tools for sustainability performance. In addition, legal requirements place an important role in setting standards such as ISO14031, Sustainability Reporting Guidelines of Global Reporting Initiative (GRI), Triple-Bottom- Line (TBL), Quadruple Bottom Line (QBL) which are the most popular managerial tools that bonding the performance with strategy. The leading global sustainability index for the empirical analysis is the Dow Jones Sustainability World Index, which is utilized for its global scope and recognized worldwide as one of the most important global sustainability indices. The aim of this research is to review popular trends for empirical studies of corporate sustainability using the Dow Jones Sustainability World Index and Sustainability Reporting Guidelines of Global Reporting Initiative, Triple-Bottom-Line and Quadruple Bottom Line. The research paper also aims to provide some suggestions for financial indicators and economic indicators along with topics for future researches in corporate sustainability performance measurement. Moreover, the research briefly addresses New Zealand Government's commitment to sustainability via Sustainable Business Council (SBC).

Keywords: *Sustainability performance, Dow Jones Sustainability World Index, Tripple-Bottom-Line, Quadruple Bottom Line*

Introduction

The term corporate sustainability (CS) is not a new concept. From the beginning, it has been challenging to define corporate sustainability in theoretical terms. An integration of definitions leads to concepts of improvement of human welfare and acquisition of natural capital as well as "measuring and reporting an organization's ecological footprint" (Sharma, 2003). In this paper, the definition of SAM (Sustainable Asset Management), the investment form in charge of the composition of DJSI, is adopted. "Corporate Sustainability is a business approach that creates long-term shareholder value by embracing opportunities and managing risks derived from economic, environmental, and social development" (SAM Group, 2007). It strengthens the traditional way of management which is to maximize shareholder's wealth. The companies/managers, therefore, may be motivated by responsibility; they may also apply sustainable strategies to maximize future long-term earnings. There are several definitions of corporate sustainability but it can be known as any response of the corporation in terms of strategies and practices to the sustainable development (economic, social, and environmental) of the corporation itself, and the world in general.

Since the 2007-2009 financial crisis – which was caused by too much focus on short-term growth and ignoring risk management with proper corporate governance in place – corporate sustainability practices were strengthened worldwide. (Brockett, 2012). Moreover, the involvement of governments and media, in terms of needs of disclosures of sustainability information in the forms of reports, which covers all businesses, markets, and strategic decisions, are increasing the awareness of sustainable development and corporate sustainability to institutional as well as individual investors. Do investors care about sustainability? There is a significant amount of research done that confirms that investors do care about sustainability as it is also about the long-term performance stability and risk management of companies (Cheung, 2011). More and more investors recognize a connection between corporate and community well-being, use corporate sustainability reporting to strengthen their investment strategies and ask the corporation to show how their sustainability practices link to growing shareholder value (PWC, 2012). Besides this, the investors' concern about corporate sustainability is evidenced with the Socially Responsible Investing (SRI) Trends published by the Social Investment Forum in the United States. SRI grew by 13 percent annually from 2007 to 2010 and as of 2010, 493 mutual funds trading in the United States were reviewed for sustainable factors in investment strategies. Theoretically, if both individual and institutional investors do care about sustainability, it would mean that stock markets might respond to corporate sustainability communication, such as the news that a company is added to (or deleted from) a global leading sustainability index which includes international leading companies incorporating sustainability practices.

The leading global sustainability index for the empirical analysis is the Dow Jones Sustainability World Index, which is utilized for its global scope and recognized worldwide as one of the most important global sustainability indices. The Dow Jones Sustainability World Index (DJSWI) was launched on 8th September 1999 and was the first global index tracking performance systems of leading companies in terms of CS. It covers the top ten percent of the biggest 2,500 companies in the Dow Jones World Index in terms of economic, environmental, and social criteria. The DJSI has some criteria according to which companies are assessed to determine the level of quality of a "company's strategy and management and its performance in dealing with opportunities and risks deriving from economic, environmental and social developments" (DJSI World, 2007).

The second trend for quantitative research is to use Sustainability Reporting Guidelines of Global Reporting Initiative (GRI), Triple-Bottom-Line (TBL) which are the most popular managerial tools that bonding the performance with strategy. GRI includes Vision and Strategy, Profile, Governance structure, and management systems, and Performance indicators which draw selectively from the financial statements. (Sharma, 2003). Meanwhile, Triple Bottom Line (TBL) reporting is an approach to evaluate sustainability using triple bottom line accounting (Elkington, 2018) which focused on 3Ps "People, Planet, and Profit". TBL reporting is strongly promoting in Australia, Britain, Japan, New Zealand, and the United States.

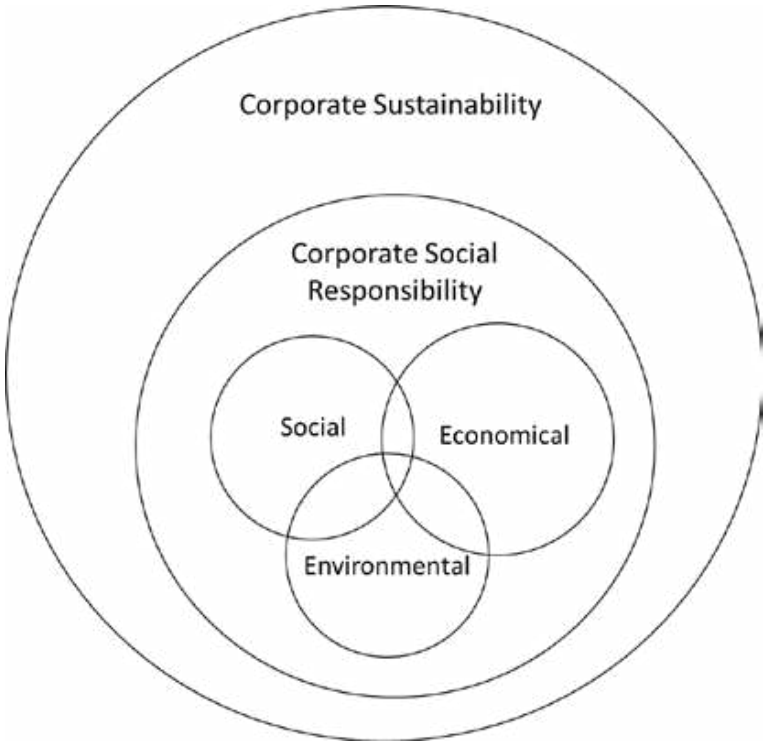
The main purpose of this study is to provide some brief information for empirical studies in corporate sustainability using these above-mentioned methods. The research paper structures as follows: Section I addresses the background motivation of the research. Section II provides theoretical evidence and a literature review of the research which is about corporate sustainability, why Dow Jones Sustainability World Index and studies the impact of corporate

sustainability on stock performances. Section III discusses the methodology of Sustainability Performance Measurement. Finally, the last section provides concluding remarks and comments.

Literature review

Corporate Sustainability (CS) versus Corporate Social Responsibility (CRS)
Literature in management uses both CSR and CS referring to the intention to bring sustainability issues, in terms of social and environmental into the managerial framework, however, no clear distinction between the two terms is stated. (Van Stekelenburg, 2015) proposed three ways defining CS and CSR in literature. The first one was where the term "Corporate Social Responsibility" covers every dimension of a corporation concerning relationships with and responsibilities to society. The second proposal was taken from Lassi Linnanen and Virgilio Panapanaan of Helsinki University of Technology (Linnanen, 2002). In the second proposal, Corporate Sustainability (CS) was considered the ultimate goal, with CSR as an intermediate stage where corporates balance three aspects of sustainability (economic, environmental, and social) as illustrated in Figure 1 below:

Figure 1. Model of CS/CRS and its dimension



Source: Lassi Linnanen and Virgilio Panapanaan of Helsinki University of Technology

The third one considered CS and CSR as synonyms with an essential distinction – "Associate CSR with the communion aspect of people and organizations and CS with the agency principle. Therefore, CSR relates to phenomena such as transparency, stakeholder dialogue, and sustainability reporting, while CS focuses on value creation, environmental management, environmentally friendly production systems, human capital management, and so forth"

(Tillman, 2011).

Dow Jones Sustainability World Index and Corporate Sustainability Assessment
The Dow Jones Sustainability World Index (DJSWI) was launched on 8 September 1999 by RobecoSam and was the first global index tracking performance system of leading companies in terms of CS. It covers the top ten percent of the biggest 2,500 companies in the Dow Jones World Index in terms of economic, environmental, and social criteria. RobecoSam is an investment company that always believes that resource scarcity, climate change, or an aging population has a direct impact on the shaping of a corporate competitive environment. Also, by adopting those challenges through innovation, continuously reviewing and upgrading the quality and productivity, a corporate creates long-term shareholder value. The Corporate Sustainability Assessment (CSA) was built in 1999 to identify top companies in terms of how well-equipped they are in dealing with sustainability opportunities and challenges from around the globe and from the industry as well. The CSA test is claimed to be one of the best-in-house for deep and integrated analysis.

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Corporate Sustainability Assessment
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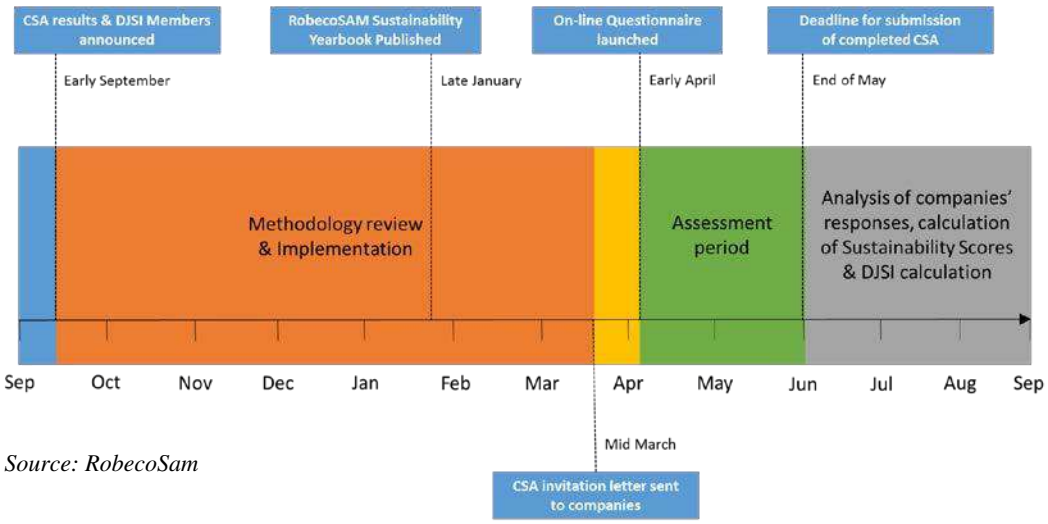
More than half of the assessed companies are based on their public information about the sustainability strategy. The results also indicate the level of awareness of the corporation on the importance of their sustainability strategy to develop/and sustain the growth of the company. It is consistent with the finding of PWC on a CS research report 2012 that CEOs are not sure if the investors do care about sustainability and note that some find it perplexing. In addition, the annual timeline of the CSA Process is represented in Figure 2.

Figure 2. The annual timeline of the CSA Process



Source: RobecoSam

Studies of DJSWI

The DJSWI has been the focus of a limited amount of academic research. Early literature focused on the structure of the DJSWI (Knoepfel, 2001) and the transparency of the DJSWI relative to the Dow Jones Global Index (DJGI) (Cerin, 2001). Comparisons between the DJSWI, DJGI and other indices have remained a topic of research over the last decade. For example, (Lopez, 2007) compared a sample of DJSWI firms with other firms in the DJGI to examine the effect of applying sustainability practices on the companies' performance and value creation. They found that there were significant differences between the two samples. In one key finding, they found that there was a short-term economic disadvantage to the DJSWI firms concerning the non- DJSWI firms.

In another paper, (Artiach, Lee, & Nelson, 2010) presented a case study comparing a group of high-ranking firms in the DJSWI with non- DJSWI firms and found that DJSWI firms are significantly different in size, profitability, and level of growth options. They argued that investment in corporate sustainability programs helped to maintain the firm's competitive position among other firms in the same industry. Consolandi et al. (2009) compared the performance of companies on the DJSWI to that of the Surrogate Complementary Index and analyzed whether or not the stock market reacts to inclusion or deletion from the DJSWI. They concluded that "the evaluation of the CSR [corporate social responsibility] performance of a firm is a significant criterion for asset allocation activities" (Consolandi, 2009) to 2007 as a proxy of CSR performance.

They could not find a significant impact of the event of index changes (measured by the average abnormal returns) on the market value of a company. The explanation for the absence of market reaction could be that investors saw no link between CSR activities and the future cash flows of a company (Karlsson, 2008). Tillmann (2011) in his Master's thesis which studies the price effects of changes in DJSWI and FTSE4Good Index, also observed no statistically positive/negative significant impact for companies being added to/deleted from DJSWI. He also tried to explain the finding on the market reaction by studying trading volume volatility around the announcement day and found the decrease in trading volume of the deletion cases in 3 trading days from the announcement date of changes. When composing the sample into

industries and countries, Tillman (2011) found significant negative abnormal returns for the Oil & Gas industry upon deletion from the DJSWI and a strong reaction to the negative announcement. Therefore, only the study of Cheung (2011) did test the effect on an effective day (day of change) separately while the remaining only investigated the effect on the announcement day and found significant impacts for a sample of US stocks. Moreover, Cheung (2011) also had an estimation window of almost 1 year (234 trading days) while Chakarova & Karlsson (2008) had a 5-month estimation window. Tillman (2011) had a 2-month and 6-month estimation window respectively.

The level of impact of CSR activities on the market value of a company changes over time as well as geographical variation (Chakarova & Karlsson, 2008). Cheung (2011) found that announcements of index changes in the DJSI from 2002 to 2007 have no significant impact on stock return and risk. Dilling (2008) conducted a sample of index changes from 2002 to 2005 across the time and observed a positive market reaction on index inclusions in 2002 and its lower increase in the years of 2003 to 2005. However, there is a geographical variation of market reaction found in the study of Dilling, but the significant market reaction was different in different industries. He states, particularly "the share prices of corporations in the consumer product, healthcare, technology, and utility industry react more positively to the DJSWI inclusion announcement than the share prices of corporations in basic material, financial and industrial product industry" (Dilling, 2008).

Table 1 below provides a summary of the main findings of previous similar studies about the relationship between sustainable development and corporate performance.

Table 1: Overview of previous empirical studies on DJSWI

Studies	Relationship	Main findings
Charakova & Karlsson, (2008)	No	The absence of a market reaction can be associated with investors' belief that CSR activities do not affect the future cash flows of a corporate. The level of impact also differs between various countries.
Cheung, (2011)	+/-	No impact on the announcement but a significant but temporary increase (decrease) on the day of change of inclusion (exclusion) US stocks. Liquidity deteriorates after the announcement day and bounces back significantly near the day of change.
Consolandi et al., (2008)	+/-	In case of inclusion, positive abnormal returns start before the announcement day (AD) and culminate around the day of the effective (ED). In the case of deletion, the cumulated abnormal returns start to diminish shortly after the AD, becoming negative shortly after the ED.
Stekelenburg et al., (2015)	+/-	On the AD, no significant impact on the stock returns for both firms' inclusion in and exclusion from the DJSI Europe. After the ED of change, stocks inclusion/exclusion experience returns increase/decrease.

Tillmann, (2011)	No	No significance was found on the inclusion/exclusion of the DJSWI. However, some strong negative significant results were found on Oil & Gas industry, and from German companies when being deleted from DJSWI.

Source: Created by the author

Sustainability Performance Measurement

In the last 20 years, different reporting models related to sustainability performance have been developed and used as tools for sustainability performance. In addition, legal requirements place an important role in setting standards such as ISO14031, Sustainability Reporting Guidelines of Global Reporting Initiative (GRI), Triple-Bottom-Line (TBL) which are the most popular managerial tools that bonding the performance with strategy. (Bonacchi and Rinaldi, 2007). In the research, I will focus on GRI and TBL as both of them involve financial and non-financial measurement and certainly, the financial indicators will be used.

GRI includes vision and strategy, profile, governance structure, and management systems, and performance indicators that draw selectively from the financial statements. Companies are focusing on sustainability in very different ways. Corporate sustainability has an integral part of both financial and non-financial measurement which constructed on (Salzmann & Ionescu-somers, 2005),

- Cost reduction attained by the improvement of working environment, health and safety performance which reduce the number of incidents, saving money for compensation, fines etc)
- Revenue increases achieved by market share gain due to “new environmental sound products”.
- Positive effects on intangible assets such as brand value and reputation, access to capital, risk management.

According to GRI 201 (2016), a guideline for economic performance, reporting requirements are revenues; operating costs, employee wages and benefits, payments to providers of capital, payments to government by country, and community investments. In terms of financial indicators, and risk/opportunity, the report requires the following information: risks and opportunities posed by climate change that has the potential to generate substantive changes in operations, revenue, or expenditure, the financial implications of the risk or opportunity before action is taken, the methods used to manage the risk or opportunity; the costs of actions taken to manage the risk or opportunity” (GRI 201, 2016).

Meanwhile, Triple Bottom Line (TBL) reporting is an approach to evaluate sustainability using triple bottom line accounting (Elkinton, 1997) which focused on 3Ps “People, Planet, and Profit”. TBL reporting is strongly promoting in Australia, Britain, Japan, New Zealand, and the United States. In TBL, "Profit" is the economic value created by the organization after deducting the cost of all inputs, including the cost of the capital tied up. It, therefore, differs from traditional accounting definitions of profit.

A suggestion for financial indicators in Sustainability Performance Measurement is made by a team of F.Medel-Gonzalez in 2013 as a combination and final selection from two mentioned above reporting models. The indicators are generation cost, investment in the triple bottom line

($/year), cost-related triple bottom line ($/year), fines. They also designed a database that supports data acquisition, data storage, and report generation known as System for Sustainability Performance Evaluation (SySPE).

Performance Measurement

Company Valuation Methods

There are six main company valuation methods which most widely used: balance sheet-based methods, income statement-based method, mixed methods, and cash flow discounting–based method, value creation, and options.

Table 2: Company Valuation Methods

Balance sheet	Income Statement	Mixed	Cash flow discounting	Value Creation	Options
Book Value Adjusted Book Value Liquidation Value Substantial Value	Multiples Value of Earnings (PER) Sales P/EBITDA Other multiples	Classic Union of European Accounting Abbreviated income	Equity cash flow Dividends Free cash flow Capital cash flow APV	EVA Economic profit Cashvalue-added CFROI	Black and Scholes Investment Option Expand the project Delay the investment Alternative uses

Source: Pablo Fernandez (2007). Company Valuation Methods. The most common errors in Valuations. Working Paper. IESE Business School. University of Navarra.

In the research, the first two methods are for indicators of company value. In general speaking, a company's value is different from different investors and each method has its owns advantages and disadvantages. Balance sheet-based methods is value a company based on estimation of its asset value with the consideration that a company value lies in the balance sheet which does not take into account the potential future value of that company. However, quite many empirical studies proved that the book value or even Price/Book Value lagged considerably below the market price.

Income statement-based methods determine the company's value based on its earnings compared to sales or other indicators. A quick valuation can be performed using multiples. Some of the commonly used multiples are the Price Earnings ratio, Value of the company/EBITDA, Price Earnings Growth (PEG) Ratio.

Enterprise Risk Management (ERM)

While traditional risk management (as hedging and corporate insurance demand) is largely concerned with protecting the firm against the volatility of financial performance due to risk, ERM makes risk management part of the firm's overall strategy and enables companies to make better risk-adjusted decisions that maximize shareholder value (Lam and Kawamoto, 1997; Meulbroek, 2002, cited in Liebenberg & Hoyt, 2003). Liebenberg & Hoyt (2011) estimated the effect of ERM on Tobin's Q, a standard proxy for firm value, and found a positive relation between firm value and the use of ERM. The ERM premium of roughly 20 percent is statistically and economically significant. Some determinants of ERM are suggested as company size, leverage, sales growth, value change, beta.

Supply Chain Management

The term supply chain refers to the system of people, activities, information, and other resources designed to transform raw materials into finished goods and services and deliver

them to the end customer. Supply Chain Sustainability involves three dimensions: environment (materials, land, energy, water), society (workplace, community, institutions, and systems), and economy (economic performance, financial health, market, and structure). To measure the financial health in economic factors of supply chain sustainability, Dr Thomas W. Sloan (2010) suggests some metrics and indicators as shown in Table 3 (Sloan, 2010).

Table 3: Example Economic metrics and Indicators

Category	Examples
Financial health	Profitability
	Cost of Goods sold
	Return on working capital
Economic performance	Productivity
	Market Value
	Order fill lead time
	Product defect rate
	Transportation cost per unit
Market and structure	Market share

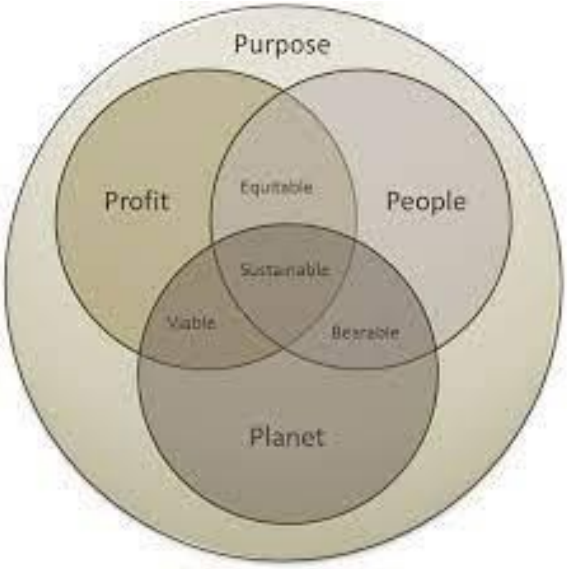
Source: Sloan, Thomas W. Journal of Global Business Management; Beaverton 6.1 (Feb 2010): 1-16.

In today's sustainability agenda, Triple Bottom Line (variously rendered as TBL or 3BL) is clearly a powerful element (Elkington, 2018).

Recent change the System - Triple Bottom Line to Quadruple Bottom Lines

The advent of the TBL proved to be a branching point. It was followed rapidly by Double and Quadruple Bottom Lines. Quadruple Bottom Line (QBL) concept focuses on sustainability and the term derived based on the Triple Bottom Line (TBL) which was initially addressed by John Elkington in 1994, adopted by businesses to measure and report their progress beyond the financial bottom line. QBL reporting focuses on the value generation to the society that is created or destroyed by an organization and it emphasizes the importance of creating value for all stakeholders of an organization, not just the financial benefits to the shareholders (Tipping, 2012). TBL had three value grounds: economic (profit), environmental (place/planet) and social (people) aspects of value creation and the QBL has as an extended new 'p for 'purpose' (Bremser, 2014).

Figure 3. Elements of QBL



People aspect of QBL concerns about providing value to society. According to Elkington, (1998) people criteria refers to conducting beneficial and fair business practices to the labour, human capital, and the community (Elkington, 1998). Practices on people aspects are employment values, corporate culture, health-based knowledge programs, diversified workplaces.

Place aspect refers to maintaining a sustainable ecosystem. Sustainable development is a consideration of the development that meets the needs of the present without compromising the ability of the future generations to meet their own needs. (Arowoshegbe, Emmanuel, & Gina, 2016). New Zealand Government commits to sustainability by an integrated approach to policy and is averse to independent policy fiefdoms for a clean and green New Zealand where it is about the long-term development- about future generations, and about ecosystem-scale and health. (New Zealand Government, 2001)

The profit aspect focuses on the economic value provided by an organization to the surrounding system and competitive productivity. Some good examples for the economical perspective of QBL are owning the market leadership, developing products for the majority of the market segments, increasing the sales and developing complementary/after-sales services, developing a market app, workshops and education programs on products.

Purpose or the progress aspect of QBL provides an opportunity for companies to focus on creating products and business models that are globalized and designed to improve community wellbeing. It concerns adaptive learning and change; trial and error risk-taking and discovery. Good examples of purpose aspects are delivering a diversified service for different communities, adaptability to the fast-moving business environment across culture, gender, age and sexuality, employment policy based on diversification and flexibility, and Corporate Social Responsibility projects towards New Zealanders.

New Zealand Sustainable Business Council – Commitment to Sustainability

New Zealand Sustainable Business Council (SBC) is the only New Zealand-based Global Network Partner of the World Business Council for Sustainable Development in Geneva and aligns to the United Nations' Sustainable Development Goals for 2030. Partners of SBC

include BusinessNZ (SBC is part of the Business NZ network), the Climate Leaders Coalition (CLC), the Climate Change Commission and other relevant government agencies. SBC has more than 100 organization members and 14 associate members. Its members generate 28% GDP of New Zealand's private sector and $87 billion in collective turnover. SBC's members make a commitment to reduce their greenhouse gas emissions and build sustainability into their purchasing decisions. SBC guides NZ businesses in annual reporting practices, which outline their progress on environmental, social, governance and economic issues. (Sustainable Business Council, 2021)

Conclusion

In the last 20 years, different reporting models related to sustainability performance have been developed and used as tools for sustainability performance. There is a significant amount of research done that confirms that investors do care about sustainability as it is also about the long-term performance stability and risk management of companies. Theoretically, if both individual and institutional investors do care about sustainability, it would mean that stock markets might respond to corporate sustainability communication, such as the news that a company is added to (or deleted from) a global leading sustainability index which includes international leading companies incorporating sustainability practices. Therefore, the Dow Jones Sustainability World Index is utilized for its global scope and recognized worldwide as one of the most important global sustainability indices.

GRI 201 (2016) is a guideline for economic performance, reporting requirements are revenues, operating costs, employee wages and benefits, payments to providers of capital, payments to government by country, and community investments (GRI 201, 2016). Triple Bottom Line (TBL) reporting is an approach to evaluate sustainability using triple bottom line accounting (Elkinton, 1997) which focused on 3Ps "People, Planet, and Profit". It was followed rapidly by Double and Quadruple Bottom Lines. Quadruple Bottom Line (QBL). TBL had three value grounds: economic (profit), environmental (place/planet) and social (people) aspects of value creation and the QBL has as an extended new 'p for 'purpose' (Bremser, 2014).

For future research on the topic, the followings need to be considered:

- Empirical studies on the effectiveness of each type of reporting system to corporate sustainable activities/strategies
- Multivariate analysis could enrich the analysis when taking into account all explanatory variables.
- The link between sustainability performance and financial performance through financial analysis.
- Abnormal returns following index changes to examine the momentum of effect in sustainability indices other than DJSWI could be investigated in a long-term event window to examine the momentum of changes.

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