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Sustainability Reporting and Firm Financial Performance: A Review of Measurement Tactics

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***Abstract* - The relationship between sustainability reporting (SR) and firm financial performance (FFP) is an extensive empirical study. However, the evidence on the nature of the relationship is unclear. A commonly defined reason for divergent and contradictory results is measurement issues, which are related to two topics of interest. The purpose of this article is to evaluate alternative operation and measurement methods applied to the SR and FFP concepts in the empirical literature on SR-FFP relationships. Our study has come to different observations. First, SR's operations in the empirical literature range from multidimensional to one-dimensional. Second, SR measurement methods include sustainability indexes, content analyzes and single-dimensional measurements, while FFP measurement methods include market value of equity, accounting-based, market-based and composite measurements. Third, one SR measurement method is not harmful. In addition to the unique drawbacks of the approach, the two problems identified in most approaches are the subjectivity of the researcher and the selection anomalies that may influence the nature of the SR-FFP relationships identified in the empirical literature. Finally, possible ways of overcoming these disadvantages are recommended.**

***keywords* - Sustainability reporting, Firm financial performance, Accounting-based measurement, Market-based measurement, Global indices**

1. INTRODUCTION

Previous research has described the failure to clarify an institution's share price based on accounting numbers alone, demonstrating the importance of non-financial data, ethical obligations, and voluntary disclosure (Almahrog et al., 2017; Byun et al., 2017). For a company, it is not enough to accept sustainability values alone, so stakeholders must be informed of their commitment to using sustainability (Rashid, 2017). For Business (CSRR) is the most comprehensive and comprehensive social responsibility document (Kilic et al., 2019), and companies can use this report to demonstrate its commitment to stakeholders. Previous research has also shown that the information disclosed in CSRR, as well as data in annual reports, could better reveal the true state of the company to stakeholders (Ullah et al., 2015). Sustainability reporting primarily includes voluntary disclosure, clearly demonstrating that there are clear business cases to use (Hossain et al., 2017). As a result, given that companies are not liable if they do not benefit from the corporate social responsibility, this disclosure plays an important role in investor regulations regarding transactions, purchases, or property rights.

Therefore, both financial and non-financial information (SR) can be considered together to explain market valuations better than a specific focus on financial statements (Reverte, 2016). In addition, the publication of additional information provides business investors with excellent confidence and independence at all stages of their activities, which increases transparency and reduces the amount of classified information (Martinez-Ferrero et al., 2015). After that, these measures may affect the determination of the company's economic value. As a result, the study also emphasizes the importance of non-financial information (especially sustainability information) disclosed by companies in their annual reports or other separate reports, such as sustainability reports or corporate social responsibility. These show the need for this research.

In addition, the global social responsibility investment movement has shown that traditional economic, environmental and social information is used to choose investments (Houqe et al., 2019). The approach that organizations can use to integrate social, economic and environmental issues transparently and responsibly into their policies, ethics, decision-making and strategies is called corporate social responsibility.

Over the past two decades, due to the increasing public interest in social and environmental issues, organizations have revealed more information about sustainability and have been closely monitored by the media (Qi et al., 2019). However, previous studies have examined the impact of financial information on business valuations, and market perceptions of data consistency may overestimate the impact of financial information (Mostafa, 2017). Thus, the disclosure of sustainability and financial information plays an important role in regulating stakeholder value and raises the question of whether these perceptions create value for market investors.

The structure of the section is as follows: The section begins with the definition of the SR concept. The empirical results of the relationship between SR and FFP are as follows. This is followed by a critical assessment of the various methods for measuring SR and FFP. Finally, a discussion and conclusions are given.

2. SUSTAINABILITY REPORTING

SR is a continuous obligation from a business to act ethically and contribute to economic progress, not only in terms of improving the quality of life of staff and their families but also the local community and society at large. Sustainability Reporting (SR) is the public disclosure of a company's SR activities (Hossain et al., 2015). Several theories have rationalized SR undertakings and reports in the literature, making it conceivable to create a multi-theoretic structure. Socio–political principles begin with an indication that an organization is a financial entity that cannot disconnected from the communal perspective by which it is formed, judged, functions, and exists (Carnevale et al., 2014). As said by Kilic et al. (2019), to endure a business must acquire the agreement and authorization of both its principal (shareholders, workforces, and consumers) and minor stakeholders (mass media and distinctive interest clusters).

Moreover, to construct and retain support from diverse stakeholders, SR actions and its disclosure are an indispensable responsible practice. Based on this assumption, some researchers have developed various theoretical opinions on SR initiatives and revelations, such as stakeholder and legitimacy theory (Fu et al., 2019). Consistent with Leventis et al. (2013), organisations apply SR information to value validity from diverse groups of interested parties. In line with Carnevale et al. (2014), SR revelation theories have two potential inferences. First, SR activity and disclosure symbolises the devices obtainable by a corporation to achieve support within its operating circumstances. Second, SR undertakings and reporting are in line with the situation wherein a business exists.

Furthermore, SR denotes a business's voluntary contributions to sustainable growth that exceeds its legal obligations. Companies are gradually being noticed as responsible for their social and environmental actions (Verbeeten et al., 2016). Enhanced SR disclosures have increased investor acceptance and created an extensive understanding that diverse corporation dealings are not restricted to stockholders (Verbeeten et al., 2016). Businesses typically notify market participants of their SR initiatives in stand-alone SR reports or a separate section of their annual report (Dhaliwal et al., 2011), with external classifications of corporation SR disclosures and/or SR undertakings sometimes available. However, there is no standardization or uniformity in terms of reported items or methods (Reverte et al., 2009). Various NGO's have started to develop models or frameworks for reporting on SR, including the Internationally Standards Organization (ISO) 14001, World Resources Institute, and Global Reporting Initiatives (GRI) (Mahtab et al., 2018; Verbeeten et al., 2016).

3. EMPIRICAL EVIDENCE ON THE SR-FFP RELATIONSHIP

For that reason, to assess the relationship between SR performance or disclosure and firm value, some researches investigate the overall effect of non-financial information in terms of societal, environmentally friendly, and other spaces of business accountability performance or disclosure (de Klerk et al., 2012; Resmi et al., 2018). Much previous research used the event-study method to investigate the temporary impacts of news concerning social and environmental performance on the organization's market value of equity (Hashim et al., 2015; Nobanee et al., 2016; Hossain et al., 2017). The above studies generally conclude that investors/shareholders penalize businesses for weak performance through adverse abnormal earnings and drops in market estimation. Carnevale et al. (2014) also advocate that the negative influence of unfavourable ecological enactment might be alleviated with more comprehensive reporting. Similarly, Hassel et al. (2005) applied the modified Ohlson (1995) price model, based on companies listed in Stockholm stock exchange, to access the relationship between value relevance (VR) in terms of share price and environmental performance ratings. Following the results, social and ecological information regarding performance ratings is value relevant, and reveal that the additional-economic value is a combination of the accounting earnings, the book value of equity and environmental and communal performance.

Furthermore, the study of de Klerk et al. (2012) investigates the stakeholders' view of the supplementary SR disclosures and the subsequent effect on their investment decision through applying modified Ohlson model to assess a corporation's equity value. He concludes that the relationship between CSRR and VR is positive; that is, superior sustainability disclosure leads to a higher value of equity. Also, Carnevale et al. (2014) examine the direct effect of sustainability reporting along with the indirect impact of financial information on the corporate share price and whether the VR of SR or sustainability reports differs across nations. They claimed that investors appreciate the additional evidence regarding sustainability issues and that have a positive influence on shares value; however, the indirect effect of book value and earnings per share are negative and insignificant, respectively. They also argued that the VR of the SR or sustainability information fluctuates through European realms, in line with diverse institutional settings.

In contrast, research conducted by Jones et al. (2007) on Australian companies showed that there is a significant negative relationship between sustainability disclosure and abnormal returns of equity value. Moreover, Cardamone et al. (2012) conducted an investigation based on 178 Italian listed organizations in the Milan Stock Exchange over the period of 2002 - 2008 and claimed a noteworthy adverse association between the company's market worth and SR revelations, where the market value of share is a function of the earning, book value, and the SR or sustainability disclosure. They also conclude that book value per share is more relevant for the SR oriented companies than their counterparts, while the value relevance of earnings per share does not change for these corporations.

If and how SR contributes to corporate performance, it has attracted great interest from academia and professionals. According to a study by Reverte (2009), the proper use of sustainability can be a source of opportunity, innovation and competitive advantage. In particular, companies that adopt policies and practices aimed at creating "shared value" simultaneously can enhance their market competitiveness and enhance the economic and social conditions of society. However, experimental studies on the percentages of SR performance have yielded different results. Margolis et al. (2010) conducted a meta-analysis of 251 studies on the relationship between CSP and corporate financial performance and found that the overall effect was positive, but the effect was small. Peloza (2009) reviewed 128 studies on sustainability and financial indicators and reported that 75 studies (about 58.6%) found a positive correlation, a mixed or neutral relationship was found, in 34 studies (about 26.7%) and 19 studies (about 14.7%) found a negative correlation. In previous research, interacting with SR was considered a long-term investment aimed at building and maintaining strong relationships with stakeholders to improve the company's efficiency. For example, SR activities are necessary to help companies grow and maintain their reputation, enhance their commitment to stakeholders, and maintain long-term business success.

Some studies have found a negative correlation between sustainability and corporate performance. Companies may tradeoff between social responsibility and financial performance, which puts them at a disadvantage. SR initiatives can also incur agency costs, as managers gain private benefits by building a reputation as a good social citizen at the expense of shareholders. Besides, SR commitments can have negative consequences and high levels of opportunity management incentives and support the opinion of executives and large shareholders on sustainability for personal gain or conceal company misconduct (Kotchen et al., 2012). The summary of the prior studies is shown in Appendix 1.

Even though the outcomes of empirical research are mixed, many accounting regulators think that information related to economic, social and environmental dimensions helps investors in policymaking and that such evidence is considered value relevant. Thus, this study hypothesized that SR revelations reduce the risk of information asymmetries in terms of enhancing business level disclosure, which subsequently impacts the organization's market value.

4. REVIEW OF APPROACHES FOR MEASURING FOR MEASURING SUSTAINABILITY REPORTING

4.1. GLOBAL INDICES AND GUIDELINES

4.1.1 GLOBAL REPORTING INITIATIVES (GRI)

Convened in 1997 by the Coalition for Environmentally Responsible Economies (CERES) and the United Nations Environment Program (UNEP), GRI is a multi-stakeholder non-profit organisation situated in the Netherlands with the principal goal of generating universally recognized guidelines for sustainability reporting. Therefore, its duty is "to enhance responsible decision making by promoting international harmonization in reporting relevant and credible economic, environmental and social performance information" (GRI, 2015).

Based on the concept of the triple-bottom-line, GRI was established and circulated the initial draft of GRI Sustainability Reporting Guidelines in 1999. Then GRI was going to launch GRI G3, which was the third generation of sustainability reporting guidelines, followed by G3.1 guideline, which are an updated version of G3 along with improvements regarding human rights, gender, and community presentation. In May 2013, GRI released its fourth generation of its guidelines, GRI G4. This GRI-G4 guidelines, additionally incorporates sector supplements guide diverse industries such as the financial sector and real estate industry (GRI, 2015).

4.1.2 UN GLOBAL COMPACT

"The UN Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption" (UN Global Compact, 2010). It is the biggest sustainability group concerned with corporations with more than 12,300 participants, of which 9,269 are companies. To comply with the UN Global Compact guidelines indicates that an organization is committed to society. UN Global Compact guidelines also stated that company generally use the UN Global Compact logo to eyewash its stakeholders that they are sustainable, but the reality is different. However, the UN Global Compact website rejects this sort of observation and states that companies are delisted if they failed to show continuous development regarding sustainability issues (UN Global Compact, 2010). Generally, the guidelines do not have any noteworthy necessities as its objective is to cause affiliates to act more sustainably.

4.1.3 ENVIRONMENTAL REPORTING GUIDELINES

In sustainability reporting practices alongside workforce conditions, climate change is one of the most relevant matters. Organizations like the World Resource Institute (WRI) and the International Standards and Organization (ISO) World Business Council for Sustainable Development (WBCSD) have all generated approaches to estimate a company's environmental influences. The Carbon Disclosure Project (CDP) administrates an annual questionnaire survey to its affiliates concerning their environmental revelations. The main aim of this survey is to strike against climate change by inspiring financiers, companies, and governments (KPMG, 2015).

4.1.4 OTHER REPUTATION INDICES

The most common way to measure sustainability is through a reputation indicator compiled by a professional rating agency. The main indexes include the MSC KLD 400 Social Index, Fortune Magazine Reputation Index, Dow Jones Sustainability Index and Vigeo Index. In addition to these important indexes, there are some country-specific indexes, such as the CFIE Index-French Company Information Center for French Companies, the Respect Index for Polish Companies, and the SR Index for Croatian Companies.

The chief advantages of indices are data availability (thus minimising data collection effort) and comparability across firms. The main advantages of the indicators are data availability (which reduces data collection efforts) and comparability between companies. Indications also have several drawbacks. Initially, they are usually formulated by private companies with their own agenda and do not necessarily use scientific methods (Galentet al., 2017). In this regard, rating agencies often do not provide comprehensive estimates of corporate social responsibility, although researchers may only be interested in certain aspects of corporate social responsibility. The second major disadvantage is the limited scope of corporate rating agencies. In terms of regions, many indicators include only specific regions or countries. Table 1 provides information on the geographical coverage of the three main listed indicators.

4.2. CONTENT ANALYSIS

The second common way of measuring SR is content analysis of corporate communication. Content analysis is a technique that converts written text into numerical code and creates several groups based on designated criteria. This method assumes that the rate of recurrence is a signal of the topic substance's importance (Muttakin et al., 2015). It aims to produce a numerically based summary of a selected disclosure items index. In line with the previous studies, content analysis of the annual report will be used to gather the data related to the SR. Content analysis method has been utilized to analyse the narrative disclosures in annual reports, sustainability report, standalone report and other reports. A key element of content analysis research design is the document to be analysed (Belal et al., 2015).

The main advantage of this approach is the flexibility of the researcher. Researchers can define the level of social responsibility of the company of interest, and based on these levels, collect data digitally and encode the data for further statistical analysis. The main disadvantage of this method is that researchers choose the level of social responsibility and use it equally at all stages of the research process in data collection, data interpretation and data coding for the company in question.

4.3. ONE-DIMENTIONAL MEASURES

One-dimensional construction focuses on the SR dimension, such as environmental management or charity. The main feature of the one-dimensional catalog is data access (which reduces data collection) and comparability of companies. The use of one-dimensional structures is a problem in theory, because the concept of sustainability is clearly multi-dimensional (Carroll, 1979). For example, some companies may include one dimension (such as employees) and ignore other dimensions (such as environmental issues). Multidimensional constructs will detect intermediate SR while one-dimensional play will detect either high or low SR where both are incorrect.

Table 1: Advantages and Disadvantages of SR measurement approaches

Measurement approach	Advantages	Drawbacks
- Indices	Data availability & comparability, multidimensionality recognised	Non-scientific, limited firm coverage (geography, size, industry)
- Content analysis	Flexibility for researcher	Researcher subjectivity, data non-disclosure, impressions management
	Flexibility for researcher	Researcher subjectivity, measurement error, non-response
-One-dimensional measures for SR	Data availability & comparability	Theoretical invalidity
-Accounting-based indicators	Data availability & comparability	Historical data
- Market-based indicators	Contemporaneous data	Data only available for listed firms, also include systematic factors

Source: *Adapted from Galent and Cadez (2017)*

5. REVIEW OF APPROACHES FOR MEASURING FINANCIAL PERFORMANCE

Each indicator has both positive and negative characteristics. On the positive side, all companies can use accounting-based metrics and make reasonable comparisons. The main feature of market-based measurement is its contemporary nature. This means that it reflects changes in sustainability faster than the accounting-based approach.

According to Ohlson's (1995) price model Value Relevance contends that the book value of financial information is a proxy for anticipated future earnings or returns. As argued by Byun et al. (2017), SR reporting might expose information about the tenacity of earnings, so that the value relevance of share prices increases when SR reporting is added to a price model as an additional variable. Gao et al. (2015) defined information as value relevant if it has an anticipated association with equity market value. For the purpose this study, the value relevance of SR disclosure was used to measure how non-economic data generated incremental increases in share price.

Regarding the restrictions, the accounting measures are considered historical. Although the general category (for example, net income) does not take into account the size of the institution, if companies are included in the sample, relative categories such as return on assets (ROA) are included. The main limitation of market-based measures is that they are only available to listed companies. Additionally, although market indicators necessarily include systemic (non-corporate) market characteristics (such as recession), accounting indicators are more sensitive to corporate perceptions of sustainability (Al-Tuwaijri et al., 2004; Mahtab, 2015; Galent et al., 2017).

It should be noted that some researchers have combined both types of indicators using indicators such as Tobin Q (market value / total assets) or MVA (market value - book value of stocks and debt) (Garcia-Castro et al., 2010; Rodgers et al., 2013). Others have also sought a comprehensive assessment of financial results by combining various existing indicators into one integrated index.

Peng et al. (2014) applied factor analysis to combine different financial performance indicators (ROA, return on equity, earnings per share, cash flows into assets) in an index. Likewise, a company's financial condition (measured according to the Zmievsky-a scale based on the company's profitability, liquidity ratio, and leverage ratio) is another measure that is used as an indicator of the company's accounting-based profitability (Rodgers et al., 2013). There seems to be a recent trend to use multiple FFP indicators. Table 2 summarizes the list of indicators of firm financial performance.

Table 2: Approaches for measuring financial performance

Accounting-based	Market-based	Accounting- and market-based
ROA	Share Price	Tobin's Q
ROE	Market value of a company	MVA – market value added
ROCE		
P/E Ratio		
Net income		

Source: *Adapted from Islam et al. (2012); Galent et al. (2017)*

6. DISCUSSION AND CONCLUSIONS

The impact of SR on FFP is a major issue for managers. Despite extensive empirical research on the nature of this relationship, the empirical literature does not provide convincing evidence. The focus of this research is to analyze and evaluate empirical research recommendations on the relationship between SR-FFP in the literature, and it can contribute to many empirical conclusions in the literature. Our literature review identified multiple approaches to SR and FFP and identified their advantages and disadvantages. Table 1 summarizes the main advantages and disadvantages of the methods identified in this study. As shown in Table 1, there is no ideal SR or FFP scale. However, as SR or FFP has a long history and is largely unified, measurement issues are more important for SR, which has not yet achieved much consistency.

Reputation metrics provide businesses with usability and comparability through standardized aggregation methods. For these reasons, it is widely used in experimental studies related to the nature of SR-FFP relationships. Stay away from the ideal benchmark for SR. A particular disadvantage is that private companies with their own agendas do not always use the exact methods usually expected in scientific research (Galent et al., 2017). The disadvantage is the limited coverage of resident companies. Data collection cases usually focus on well-known large public companies. Because these companies are under tremendous social pressure to undertake social responsibility, they can lead to selection bias and may do better than intangible companies.

Content analysis gives researchers the opportunity to select interesting SRs, gather information about these dimensions, code the data, and generate quantitative scores for subsequent quantitative analysis. Subjectivity is associated with all stages of the research process: selecting areas of interest, gathering information about these dimensions, interpreting quality data, and coding quality data for further quantitative analysis. Because SR reporting is not mandatory in most jurisdictions, responsible companies report more about performance than low-responsibility companies, and the benefits of choice can be new (Belal et al., 2015). Another related issue is impression management (Galent et al., 2017). This suggests that what is reported may differ from what is observed (reporting bias).

The first common problem is subjectivity to researchers. When using a reputation index or unilateral aspect in a statistical model, SR-FFP can be used to analyze the results and may affect the results of the research relationship. This is because researchers obtained the model, the variables in the model, and the statistical tests used to analyze relationships, so that they could apply hypotheses. Even if SR-related data is obtained from a reliable archive source, wrong conclusions can be drawn.

Fortunately, there is a solution. One possible solution to the researchers' self-issues is to standardize SR reports. Forty years ago, Ramanathan (1976) requested the use of corporate social accounting to provide regular information about the company's social performance, but to this day it still does not meet the acceptance criteria. However, there are some standard procedures, such as the Global Reporting Initiative (GRI), the responsibility standard responsible for AA1000 certification, the United Nations Global Progressive Communication (COP), and ISO 26000.

In summary, a review of the operating and measurement methods of the SR concept illustrates that all methods used in empirical literature have weaknesses that may affect the relationship between the SR and the FFP that was discovered. It became clear. The two problems inherent in most, if not all, of the methods are self-bias and investigator selection. The potential solution to the first problem is alleged to be the standardization of RS reports, and the possible solution to the second problem is the mandatory disclosure of SR information. Not only are standardization and disclosure useful in an effective SR-FFP Relationship Test, but also beneficial in making economic decisions for many stakeholders.

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Appendix 1: Summary of the key literature relating to Sustainability Reporting and Firm Financial Performance studies

Author(s)	Sample	Country	Dependent variable/ Firm Financial Performance	Sustainability Reporting/ Independent variable	Results (Relationship)
Verbeeten; Gamerschlag and Möller (2016)	130 German companies over four years a total of 370 firm-year observations	Germany	share price	Study apply a coding Framework based on the GRI's Guidelines.	SR information is value-relevant, but the value relevance of SR information varies among SR classifications.
Reverte (2014)	listed Spanish companies pertaining to the IBEX35 index for the period 2007–2011	Spain	share price	reports issued by the OCSR those firms listed on the Madrid Stock Exchange and included in the IBEX35 index	CSRR by businesses works in environmentally-complex sectors is associated with higher market value than SR disclosure than non-sensitive industries.
Alotaibi And Hussainey (2015)	171 non-financial firms listed in the Saudi stock market for the period 2013-2014.	Saudi Arabia	Three measurements of firm value. These are Tobin's Q ratio, market capitalization and ROA.	Use a SR disclosure index	Positive association between SR disclosure quality and quantity and market capitalisation. Though, did not find any association in case of TQ and ROA
Carnevale and Mazzuca (2014)	European listed banks from the second quarter of 2002 to the second quarter of 2011.	Europe	pit is the stock price at the end of the quarter	SRit is a dummy variable for bank i at quarter t, equal to 1 if the bank publishes the SR and 0 if it does not,	Disclosure generates a positive consequence on stock prices.
De Klerk and de Villers (2012)	the top 100 South African companies	South Africa	modified Ohlson model	GRI guidelines for SR	Positive.
Carnevale,Mazzuca and Venturini (2012)	sample of 130 European-listed banks	Europe	the logarithm of the stock price for bank	dummy variable SR publication	Not significant
Islam, Ahmed and Hasan (2012)	Banking sector	Bangladesh	(ROA); (ROE); (ROI); (ROS); (EPS) (P/E); Share price returns; Total Assets; Sales growth; Assets growth; No. of Employees; Excess market Valuation; Asset Age Asset turnover; Operating earnings to assets Operating earnings to sales	SR Index	Positive
Resmi, Begum and Hassan (2018)	Agri-business	Bangladesh	ROA, ROE, NI, EPS	SR Index	Mixed +/-

Mahtab, 2015	201-2014 (MNCs)	Bangladesh	ROA, ROE, NI, EPS	SR Index	+
Hossain et al., 2015	131 listed companies	Bangladesh	ROA, ROE, NI, EPS	SR Index	Mixed +/- based on ROA/E or TobinQ
Kotchen et al., 2009	3,000 publicly traded companies	International	ROA, Debt Ratio, Assets, Sales.	LD Social Ratings Database	Positive
Peloza et al., 2012	Reviewed 159 studies	International	Profitability, Share price, ROA		Positive
Peng et al., 2014	Taiwanese listed firms from 1996 to 2006	Taiwan			Ownership negatively moderate the rtelationship
Rodgers et al., 2013			accounting-based (financial health) and market-based (Tobin'sQ) performance measures.		Positive
Garcia et al., 2010	Panel data of 658 firms from 1991 to 2005	International			Mixed