

International Conference on Accounting Studies 2014, ICAS 2014, 18-19 August 2014, Kuala Lumpur, Malaysia

Exploring the relationship between carbon performance, carbon reporting and firm performance: A conceptual paper

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Abstract

In recent years, there has been an increased interest in carbon information disclosure. This research aims to examine carbon reporting practices of Malaysian companies. Further analysis will be conducted to examine the influence of internal organizational factors on the carbon reporting practices. The relationship between carbon performance, carbon reporting and firm performance will be investigated. This paper also explores the moderating effect of the corporate governance quality on the relationship between carbon reporting practices and firm performance. The findings from this study have a significant contribution to carbon reporting literature, Malaysian companies, government and accounting regulation body.

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Peer-review under responsibility of the School of Accountancy, College of Business, Universiti Utara Malaysia.

Keywords: Carbon reporting; internal organizational factors; corporate governance quality; carbon performance; firm performance

1. Introduction

In the accounting literature, carbon reporting is essentially a new concept which has emerged in the last few years. Najah (2012, p.7) defined carbon reporting as a “*set of quantitative and qualitative information that relates to a firm’s past and forecasted carbon emissions levels; its exposure to and financial implications of climate change associated risk and opportunities; and its past and future actions to manage these risks and*

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opportunities". It was initially studied as a sub-set of environmental reporting and most of the reporting is prepared on a voluntary basis (Andrew & Cortese, 2011).

There is a consensus view that increasing greenhouse gases (GHG), mostly carbon dioxide in atmospheres (CO₂) exceed the normal standard leads to the phenomenon of global warming (Cole et al., 2013). As the carbon emissions could have a substantial effect on business activity and behavior (Saka & Oshika, 2014), companies need to control and limit CO₂ emissions and take into account the climate aspects in their business strategy (Gallego-Álvarez et al. 2011). In this sense, it is clear that carbon emissions are critical components of sustainability, thus reporting practices can be applied to carbon issues (Lodhia & Martin, 2012). Carbon reporting could be an important mechanism to exert pressure on companies to reduce their emissions, thus could have a role in achieving climate mitigation objectives (Ennis, Kottwitz, Lin & Markusson, 2012). By disclosing CO₂ emissions information, Department for Environment, Foods and Rural Affairs has estimated that in the year 2021 four million tonnes of CO₂ emissions could be saved (Carbon Trust, 2012).

A number of studies have documented evidence on carbon information disclosure in companies' annual reports and sustainability reports. The majority of the earliest studies has focused on the USA, UK and Australia. However, studies on carbon emission in developing countries are limited. In Malaysia, most of the previous researches examine the disclosure in the context of broader environmental disclosures and disclosure to Carbon Disclosure Project (CDP).

Despite the recent increase in the number of reporting companies, there is growing criticism among investors that companies are not providing information that can be used in investment decision-making (Ziegler, Busch & Hoffmann, 2011). Some companies also fail to fulfill the accountability to wider stakeholder (Haigh & Shapiro, 2012) and use greenhouse gas (GHG) information as a mechanism for companies to legitimize themselves (Prado-Lorenzo et al., 2009). Additionally, there is a lack of transparency, credibility, reliability, completeness (Ennis et al., 2012) and lack of a consistent framework to guide disclosure (Lodhia & Martin, 2012). Thus, it remains difficult to examine the linkage between carbon reporting practices and firm performance and GHG emissions reduction (Kolk, Levy & Pinkse, 2008).

The literature on carbon emission disclosure also identifies a variety of reasons why companies may take action to disclose carbon information. Relative to corporate characteristic and general contextual factors, internal organizational factors have been understudied in the literature on voluntary corporate behavior (Howard-Grenville, Nash & Coglianesi, 2007) and corporate disclosure (Adams, 2002). Thus, it is important to consider the influence of internal organizational factors on carbon reporting practices since the credibility of reporting relies on internal organizational systems (Rankin, Windsor & Wahyuni, 2011).

The relationship of carbon performance, carbon reporting and firm performance is also gaining attention from researchers. However, there is an unresolved debate on whether carbon disclosures are consistent with corporate carbon performance. Additionally, the relationship between carbon reporting practices and firm performance remains limited (Ennis et al., 2012). This raises the questions whether carbon reporting practices of Malaysian companies are consistent with corporate carbon performance and whether carbon reporting influence firm performance? Drawing from the above, this study aims to (1) develop a comprehensive carbon reporting index to assess the quantity and quality of carbon reporting of Malaysian companies, (2) examine the influence of internal organizational factors on the carbon reporting practices, (3) investigate the relationship between carbon performance, carbon reporting and firm performance, and (4) examine the moderating effect of corporate governance quality on the relationship between carbon reporting practices and firm performance.

The remainder of this paper is organized as follows. Section 2 reviews the previous researches related to this study. Section 3 describes the sample selection, data sources, instrumentation and analysis. Finally, Section 4 provides concluding comments for the paper.

2. Literature review

2.1. Carbon reporting practices - An overview

Carbon-related disclosures have increased significantly in the last five years and many of these disclosures remain voluntary (Andrew & Cortese, 2011). Previous studies have examined the existence of carbon information in companies' annual reports. In a survey of executives in 300 global companies with over \$1 billion in revenue,

64 percent of the respondents indicated that they disclosed greenhouse data in an annual report (Ernst and Young, 2010). Freedman and Jaggi (2005) report that only 54 out of 120 (45%) sample firms provided information on carbon dioxide emissions. In terms of disclosure level, Freedman and Jaggi (2005) revealed that firms from Protocol ratifying have higher disclosure indexes as compared to non-ratifying countries. However, multinational firms that operate in countries that ratified the Protocol but have their home offices in countries that non-ratifying are associated with lower disclosures. In addition, larger firms making more extensive disclosure on pollution information compared to smaller firms. Prado-Lorenzo et al. (2009) revealed that on average companies report ten out of 19 indicators that have been constructed in the disclosure index and found that the volume of carbon information are different between companies, sectors and countries. The volume of information is high for the companies that operated in petroleum refining, motor vehicles and parts, and utilities sector, which are considered to be more sensitive to greenhouse gas emissions. Moreover, the results obtained show a direct relationship between corporate size, its market capitalization and the disclosure of information.

Previous studies also look at the comparability of the information disclosed and reliabilities of methodologies used. Andrew and Cortese (2011) examines carbon related data produced by Australasian mining companies in compliance with the Information Request sent to them by the CDP over a three year period. The result revealed that CDP information is not comparable since the companies used a combination of methods for their disclosures and thus limited in its usefulness. Dragomir (2012) focused on GHG accounting procedures and disclosures of the top five oil and gas companies selected from the STOXX Europe Total Market Index Oil and Gas Producers index in the European Union (EU). The author also assesses the reliability of methodologies used for emissions data collection and aggregation of GHG emissions. The information contained in sustainability reports published by these companies was benchmarked against the Greenhouse Gas Protocol Standard. The result shows that these five industry leaders have issued reports containing unexplained figures and methodological inconsistencies.

2.2. The influence of internal organizational factors on carbon reporting practices

Relative to corporate characteristic and general contextual factors, internal organizational factors have been understudied. According to Rankin et al. (2011), specific internal organizational systems are crucial to enable companies to monitor, measure and record emissions levels to mitigate the risk associated with future regulatory requirements and changing societal expectations. The implementation of internal organizational systems such as environmental management systems (EMS) may facilitate the company's communication to external stakeholders (Malmborg, 2002). A study by Herschovis, Herremans and Warsame (2009) revealed that EMS offer considerable explanatory power as a driver of corporate sustainability reporting. According to Adams (2002), having an environmental committee as part of the board committee structure is an important internal factor to provide governance to address climate change. On the other hand, Peters and Romi (2012) found that the presence of an environmental committee and a Chief Sustainability Officer (CSO) are positively related to the probability of risk disclosure and disclosure quality. Further analysis show that the expertise of the environmental committee members and the CSO are associated with GHG disclosure quality while larger committees tend to be associated with lower disclosure quality.

2.3. The relationship between carbon performance and carbon reporting

The relationship between voluntary environmental disclosures (including GHG disclosure) and environmental performance is both complicated and controversial (Zhu & Zhang, 2012). Voluntary disclosure theory posits that firm with better carbon performance tends to provide more information through voluntary disclosure while the worst performing company tends to remain silent (Clarkson et al., 2008). Consistent with this theory, Al-Tuwaijiri et al. (2004), Clarkson et al. (2008) and Dawkins & Fraas (2011) revealed that a good environmental performers disclose more environmental, discretionary and climate change information.

However, several studies report a negative relationship, in which bad environmental performance disclose more environmental information than other firms in order to avoid adverse selection (De Villers & Van Staden, 2011; Healy & Palepu, 2001). Since capital providers were concerned in risk, future cost and liabilities (Azzone et al., 1997), bad performers provide additional information regarding the reasons for the bad performance and the

remedial actions taken in an effort to reduce information asymmetry, associated political cost and political action (De Villers & Van Staden, 2011). This argument is supported by Iatridis (2013) in which poor performers are subject to more remediation than those who have not engaged in environmental degradation and inclined to disclose more information to legitimate themselves. Ennis et al. (2012) however, found no significant relationship between the carbon performance and carbon disclosure in FTSE 350 companies.

2.4 *The relationship between carbon performance and firm performance*

The relationship between carbon performance and firm performance will be examined based on stakeholder theory perspective. Stakeholder theory posit that the firm's success is dependent upon the successful management of all the relationships that a firm has with its stakeholders (Ullman, 1985). Firms that build relationships with stakeholders founded by mutual trust and cooperation can lead to a competitive advantage (Jones, 1995) and be a source of superior performance (Barney, 1991). However, if some or all of these stakeholders become dissatisfied, the corporation unable to continue as a going concern (Clarkson, 1995). In environmental management perspective, "stakeholder theory predicts that if firms try to lower their implicit costs by acting environmentally irresponsible (e.g., not investing in pollution control systems) they will actually incur higher explicit costs, which can result in a competitive disadvantage" (Galbreath, 2006. p. 1109).

The empirical results of this relationship have been inconclusive and even conflicting. Al-Tuwaijiri et al. (2004) found a significant positive relationship between environmental performances and economic performance, suggesting that good environmental performance results in improved economic performance. Jacobs, Singhal and Subramanian (2010) affirmed that improved environmental performance can also provide access to new markets, thus will result in improved revenue. Improved environmental performance can also affect costs, leading to improved performance (Jacobs et al., 2010).

However, some studies such as Sarkis and Cordeiro (2001) reveal a negative relationship between pollution prevention and end-of-pipe efficiencies with the return on sales. Meanwhile Ennis *et al.* (2012) reported that emissions levels does not influence the stock prices. The result imply that the market participants is not yet responsive to the carbon performance of companies. In addition, there is a possibility that the information available is not adequate to provide clear signals to distinguish between the companies' performance.

2.5 *The relationship between carbon reporting and firm performance*

Many researches have revealed that a company that voluntarily provide carbon emission in the annual reports or sustainability reports can enhance its reputation for environmental responsibility and lead to economic benefits. Based on signaling theory, firms disclose value relevant information to satisfy investors' demands for information (Wang & Hussainey, 2013). Signaling theory assume that managers have superior information as compared to outside investors on company's expected future performance, even with the assumption of an efficient capital market, and managers may enhance the quality of their financial reporting by voluntarily providing additional disclosures (Healy and Palepu, 2001).

However, detailed review in this area reports conflicting results. Ziegler et al. (2011) and Griffin and Sun (2012) found a positive relationship between the disclosure of carbon reduction measure and climate change information with stock performance. Nevertheless, Prado-Lorenzo et al. (2009) found a negative relationship between GHG disclosure and return on equity while Stanny and Ely (2008) found no relationship between carbon disclosure and investment, further suggesting that carbon disclosure does not drive a firm's performance.

2.6 *The moderating effect of corporate governance quality on the relationship between carbon reporting and firm performance*

The studies on carbon reporting practices and firm performance report mixed results. Several studies reveal that the market does value the extent of carbon reporting. Studies that found a negative relationship suggested that investors recognize carbon information disclosure as bad news. Therefore, they are anxious that the cost of managing the global warming would outweigh any benefits (Hsu and Wang, 2013). These conflicting results may raise the question on the factor that can mitigate this effect.

Corporate governance practices are very important in considering the extent to which companies are proactively addressing climate change agenda (Rankin et al., 2011). Prado-Lorenzo and Garcia-Sanchez (2014) asserted that the Board of Directors played a role in disseminating relevant information on GHG emissions to users. Cong and Freedman (2011) found a positive relation between good governance and pollution disclosures of firms. Consistent with Cong and Freedman (2011), Choi et al. (2013) reveals that firms with superior corporate governance are more likely to make better carbon emission disclosure.

Besides, there is a related strand of literature that considers good corporate governance practices affect corporate performance (for example see Eberhart, 2012; Haat et al., 2008; Mishra and Mohanty, 2014). Consistent with agency theory, previous studies reveal that information asymmetry can be reduced through effective corporate governance (Cormier et al., 2010; Siagian, Siregar and Rahadian, 2013). Frost, Gordon and Hayes (2002) asserted that improved corporate governance practices could contribute to better disclosures in business reporting, consequently, could facilitate better market liquidity and capital formation. Che Haat, Abdul Rahman and Mahenthiran (2008) confirmed Frost et al.'s (2002) argument that good corporate governance practices affect corporate performance and firm value. Hence, our study suggests that corporate governance quality should moderate the relationship between carbon reporting and firm performance.

Among the studies that used corporate governance quality as a moderating factor are Cormier (2012) and Shu et al., (2010). However, Cormier used corporate governance quality as a moderating factor between social and environmental disclosure and financial analysts forecast while Shu et al. (2010) used it between corporate environmental disclosure and earnings management.

3. Sample selection, data sources, instrumentation and analysis

The sample will be drawn from the manufacturing companies listed on the main board of Bursa Malaysia covering financial periods of 2007 to 2012. Companies were randomly selected using the random number generator available in excel. This period is chosen due to various developments in the carbon regulation and awareness that took place. In general, the year 2007 has been selected as the starting point as it was a year in which the global warming and climate change risks was gaining public visibility (Lash & Wellington, 2007). Additionally IPCC issued a report on climate change issues. Thus, following the publication of the Intergovernmental Panel on Climate Change Report in 2007, carbon reporting becomes a part of corporate life (Alrazi, 2013). Meanwhile the year 2012 is chosen because it presents the most recent available data.

Data will be extracted through content analysis method from selected companies' documents. Carbon reporting can be found in annual reports, special environmental reports and company websites (Freedman & Jaggi, 2005). However, annual reports remain the most widely used document in the analysis of carbon reporting for the reason that they are produced regularly (Buhr, 1998), widely read (Deegan & Rankin, 1996), have high degree of credibility and reliability of information reported due to auditing verification (Tilt, 1994), highly accessible (Unerman, 2000) and complete in terms of the company's communication on social issues and environmental performance (Gray, Kouhy & Levers, 1995). Furthermore, carbon reporting is in its infancy in Malaysia, therefore, it is believed that very few companies produce a stand-alone environmental performance report (Nik Ahmad & Sulaiman, 2004).

To measure the quantity of carbon information, the sentence will be used as a unit of analysis in this study since it has been evaluated as an appropriate unit in previous research (Ingram & Frazier, 1980). It is a pertinent measure for recent studies due to its reliability, accuracy and contains fewer errors as compared to counting individual words (Ingram & Frazier, 1980; Hackston & Milne, 1996; Milne & Adler, 1999). Furthermore, sentences are easily identifiable, overcoming the problem of allocating a portion of a page and removing the need to standardize the number of words (Ingram & Frazier, 1980) and can be used to convey meaning (Hackston & Milne, 1996).

To analyze the quality of carbon reporting in annual reports, this study will develop carbon reporting index. The index measures the comprehensiveness of the carbon information in terms of its breadth, depth and the reliability of the information. Therefore, the formation of reporting index is consistent with the concept of accountability and the principle of full disclosure of accounting information (Alrazi, Nik Ahmad & Sulaiman, 2009). The assessment of the quality of carbon reporting using disclosure index is essential in monitoring the carbon disclosure practices of companies over time and will increase competition between companies, hence ensuring a more comprehensive information (Hadley's study as cited in Jones & Alabaster, 1999).

The information on carbon emissions will be obtained from an energy audit report. Most of the previous studies used perception-based measures such as scores, ratings, lists, and indexes from Fortune's The Most Admired Companies, the Kinder Lydenberg Domini survey (see Hsu & Wang 2013), the Dow Jones Sustainability Index, the Domini Social Index, the Investor Responsibility Research Centre and Innovest (Saka & Oshika 2014). In contrast, this study will use performance-based measures, that is the volume of carbon emissions as a proxy for carbon performance since this measure is objective and directly reflects company performance. Saka and Oshika (2014) stressed that the relation between disclosure and corporate value depends on the actual volume of corporate carbon emissions. Therefore, the relation between disclosure and corporate value should be analysed on the presumption that the volume of actual carbon emissions affects corporate value.

4. Conclusion

Carbon reporting is a new concept and the studies that analyse the carbon reporting practices worldwide are still limited. Although the number of reporting companies is increasing, there are several shortcomings in the current carbon reporting practices in terms of its commensurability and comprehensiveness of the information disclosed. Furthermore, methodological weaknesses in several studies have contributed to the mixed results for relationships between carbon performance, carbon reporting and firm performance. A credible carbon reporting is crucial to enable various stakeholders to make accurate decisions. Hence, the comprehensive and transparent carbon disclosure index that can offer standardized reporting guidelines is needed to enable business to focus their action on areas that will lead to substantial environmental improvement.

This study is important for several reasons. This study makes a significant contribution to carbon reporting literature by examining the influence of internal organizational factors on carbon reporting, exploring the relationship between carbon performance, carbon reporting and firm performance as well as examining the moderating effect of corporate governance quality on the relationship between carbon reporting practices and firm performance. In addition, this study will develop a disclosure index, thus, Malaysian companies may utilize this index to measure the quality of information disclosed.

Considering that the Malaysian Government has targeted to reduce carbon emission by 40% in year 2020, it is crucial to examine the current extent and credibility of carbon reporting of the Malaysian companies. Through carbon reporting practices of Malaysian companies, it allows the government to measure progress toward achieving this target as well as contribute to public debate on climate change policy and regulation. Additionally, the results of the study provide further substance to call for an accounting regulatory body to issue a specific standard on carbon reporting. Without the use of a defined reporting standard, the credibility of a company's reporting will probably be at stake.

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