Sustainability reporting: external motivators and internal facilitators

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Abstract

Purpose – *The purpose of this study is to investigate the role of internal variables, such as strategic governance and operational controls, along with external variables that influence sustainability reporting.*

Design/methodology/approach – *Building on the corporate governance and sustainability reporting literature, the authors develop a model to integrate external motivators and internal facilitators to determine their impact on sustainability reporting. The authors also control for a number of financial and non-financial variables that may influence sustainability reporting. The authors limit their sample to the companies in extractive industries that report their greenhouse gas emission to the Government of Canada. The authors collected the data from several data sources including secondary archival databases, newspapers, Web sites and annual reports.*

Findings – *Using a sample of companies in high-polluting industries, the authors found that variables representing both external pressures that act as motivators and internal controls that act as facilitators are significantly associated with enhanced sustainability reporting.*

Practical implications – *Considering the formation of several international initiatives such as International Integrated Reporting Council to improve sustainability reporting for decision-making, the authors' research provides interesting insights both to policymakers and managers about organizational characteristics that are important to make reporting useful and relevant.*

Originality/value – *Little academic research has investigated the role of internal variables in facilitating sustainability reporting. The authors use a robust model that combines external and internal variables to more thoroughly understand the reporting process.*

Keywords *Sustainability reporting, External pressures, Operational control, Strategic control*

Paper type *Research paper*

Introduction

Today, with more serious concerns about environmental and social conditions, the business and investment communities are demanding and relying on various types of sustainability[1] (economic, environmental and social) information for decision making (Delmas and Burbano, 2011). The recent formation of the International Integrated Reporting Council (IIRC), along with several other global initiatives, sends a signal that the business community is taking sustainability reporting seriously. Given that we are entering what appears to be a new era of enhanced sustainability reporting, the question arises as to which variables external to the organization can motivate and which variables within the organization can facilitate enhanced sustainability reporting. The importance of identifying these variables has been underscored by several professional organizations (IIRC's Discussion Paper, 2011; KPMG, 2011). Early research on sustainability reporting concentrated largely on external institutional influences for motivating disclosure of social and environmental information (Bewley and Li, 2000; Cormier and Magnan, 1999, 2003; Neu *et al.*, 1998; Patten, 2002). Although external pressures are important, Howard-Grenville *et al.* (2008) suggested that they only help to understand part of the business decision, as companies subjected to the same external pressures behave

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differently (Moir, 2001). Later research (Bansal, 2005; Darnall *et al.*, 2008) has recognized that even though external pressure may appear forceful and coercive (Delmas and Toffel, 2004; Perez-Batres *et al.*, 2012), an organization needs internal structure and resources to facilitate sustainable behavior (Herremans *et al.*, 2009; Clarkson *et al.*, 2011; Howard-Grenville *et al.*, 2008; Perego and Kolk, 2012; Abreu *et al.*, 2005).

Using a sample of Canadian companies from extractive industries, our study answers the call by professional organizations and researchers to combine variables of internal structure as well as external pressures that provide insight into the sustainability reporting decision (Adams and Larrinage-González, 2007; Howard-Grenville *et al.*, 2008). Our study uses an integrated model that combines proxies for external pressures as motivators (i.e. institutional investors and media exposure) along with internal structures (i.e. board governance and environmental management systems [EMSs]) as facilitators of reporting.

In the next section, we describe the literature supporting the development of our model, which leads to our hypotheses. Then, we explain data collection, the empirical model and operationalization of variables. In the final section, we elaborate on the results and contribution of our study.

Literature review and hypotheses development

The literature review is separated into two sections:

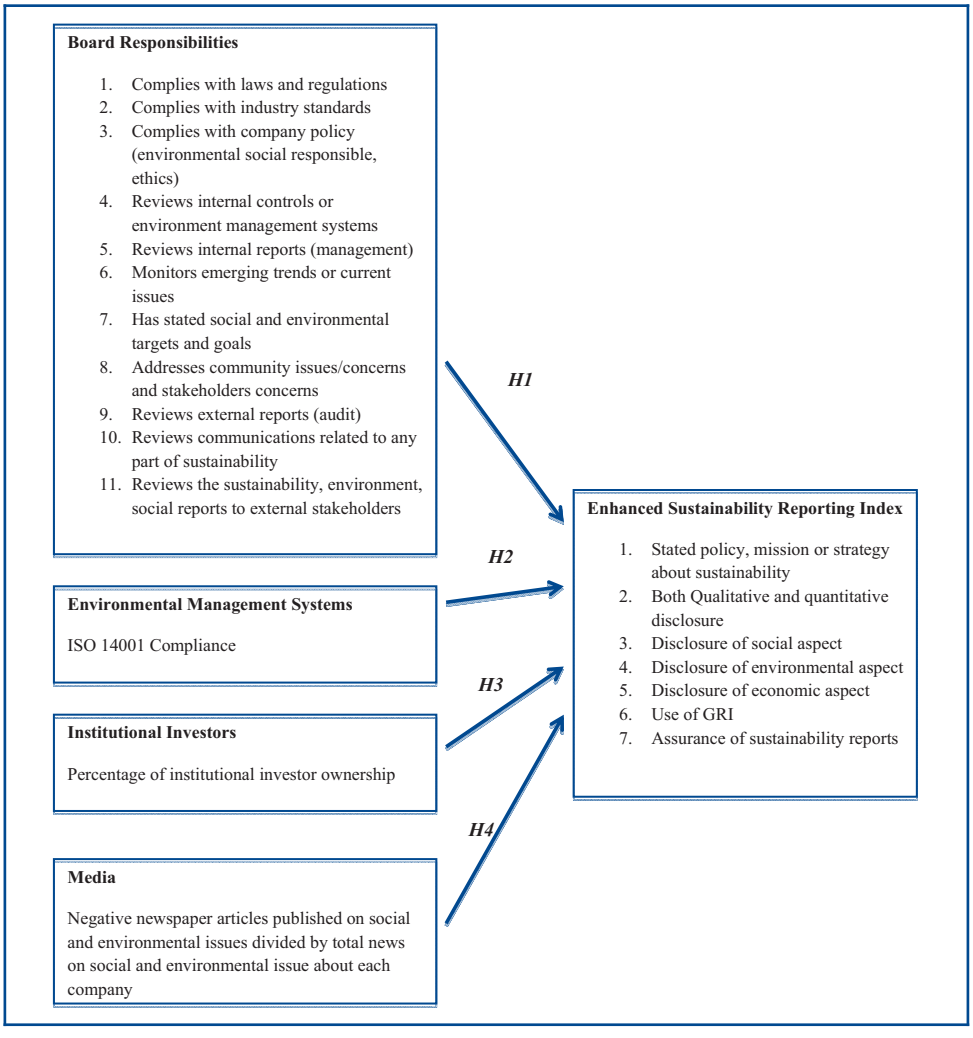
1. internal facilitators, consisting of strategic control at the board of director level and operational control at the management level; and
2. external motivator proxies, consisting of institutional investors and media exposure (Figure 1).

Strategic control: corporate governance responsibilities

The general management literature includes extensive investigation of the importance of the role of corporate governance in regard to various aspects of firm performance. The "tone at the top" determines the extent to which ethics, transparency and accountability will be taken seriously (Huang, 2010; MacMillan *et al.*, 2004). Using a sample of US companies listed on Kinder, Lydenberg, Domini (KLD) social rating database for the period of 2003-2004, De Villiers *et al.* (2011) found that larger boards with greater board independence, more active chief executive officers (CEOs) and more legal experts will lead to better environmental performance. De Villiers *et al.* (2011) limited their study to the environmental aspect of sustainability and investigated the influence of general board governance variables including CEO duality, director ownership, independence and board's resource dependency (e.g. board size, board, tenure, more active CEO and law experts) on environmental performance. Research on the role of the board regarding the organization's broader social responsibility that includes both social and environmental is limited (Berrone and Gomez-Mejia, 2009), especially empirical analyses of the board's role regarding sustainability reporting. If companies are using their sustainability reporting as a means of establishing trust in a society (Solomon, 2010), then increasing the board's involvement in the process of reporting would send a strong signal of transparency.

A number of initiatives from various parts of the world have echoed the importance of governance mechanisms in sustainability reporting. For example, the Corporate Governance Council of the Australian Stock Exchange recommended that part of good governance was to provide sustainability disclosure (Gibson and O'Donovan, 2007). As well, the Global Reporting Initiative (GRI) suggests that organizations report the role that corporate governance plays. Ricart *et al.* (2005) examined 18 of the Dow Jones Sustainability World Index leaders and found that most of their case companies had board-level values and convictions along with the necessary expertise to address

Figure 1 Research hypotheses and main variable definitions



sustainability issues. Furthermore, they investigated how the board is structured and how it considers corporate responsibility in agenda items.

Further investigating board structure, Clarkson *et al.* (2008) found that the existence of a special committee was significant in improving the quality of sustainability reporting. In their qualitative study of the petroleum industry, Herremans *et al.* (2009) found that the companies they term "laggards" were less likely to have a board committee specifically to address environmental issues. If a board committee did exist within the lagging companies, the duties of the committee were narrowly focused on meeting regulatory compliance rather than on broad-level sustainability demands of their multiple stakeholders. We extend the Clarkson *et al.* (2008) and Herremans *et al.*'s (2009) research by providing a finer grained context to the special board committee. We investigate the specific responsibilities of the special board committee in relationship to reporting but do not limit our study to the petroleum industry as Herremans *et al.* (2009) did. The values of the board members, instrumental in determining the board's direction (Ricart *et al.*, 2005) will be reflected in the breadth of the responsibilities of the board committee. Therefore, we present the following hypothesis:

H1. The existence of strategic control in the form of broader recognition of responsibilities of the board of directors' special committee for sustainability is associated with enhanced sustainability reporting.

Operational control: existence of a certified EMS

According to the International Standards Organization (ISO), an EMS is "the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy" (ISO 14001). Klassen (2001) found that management's attitudes toward the environment affect the orientation (proactive versus reaction) of the EMS. Using a qualitative research approach, Melnyk *et al.* (2003) reported that managers felt positively toward an EMS and ISO 14001 (the EMS certified by the ISO) as methods for ensuring improvement in environmental and operational performance.

Investigating whether an EMS actually resulted in better performance, Anton *et al.* (2004) confirmed that companies that adopted more comprehensive EMSs reduced their toxic emissions per unit of output. King *et al.*'s (2005) findings are similar: ISO 14001 certified facilities result in significantly more reductions in toxic emissions compared to non-ISO certified facilities. In a more recent study, Henri and Journeault (2010) found that existence of an eco-control system that integrates environmental issues with a management control system has a significant impact on environmental performance.

However, none of the earlier studies conducted an empirical analysis to investigate if a certified EMS (ISO 14001) would facilitate reporting. Using content analysis on a sample of Fortune's Global 200 companies, Jose and Lee (2007) observed that the external validation through ISO 14001 certifications is increasing by companies that provide sustainability disclosure. Approximately, one quarter of the reporting companies in their sample had external certification. Based on this observation, they projected that as companies' level of disclosure increases, the number of companies seeking external validations will also increase. We operationalize this projection by including a variable for the existence of a certified management system (ISO 14001) in our empirical analysis of enhanced disclosure, therefore:

H2. The existence of operational controls in the form of a recognized, certified environmental management system is associated with enhanced sustainability reporting.

External influences: the role of institutional investors

Both institutional and individual investors' concerns about the risk associated with potential litigation, physical damage and business disruption, increased regulatory requirements, reputational implications and changes in competitiveness or consumer presence motivated the Securities Exchange Commission in the USA and the Canadian Securities Administration to issue guidance on increased disclosure required in the Management Discussion & Analysis section of the annual report. By comparison, institutional investors can take a more unified action than can the individual investor who holds a few shares of stock. More than 109 resolutions were filed in 2011 for US companies by shareholders, many of them institutional, requesting enhanced performance or reporting related to sustainability challenges and opportunities (Investor Network on Climate Risk, 2012). Some resolutions request companies to adhere to a specific level of reporting based on the GRI Sustainability Reporting Guidelines. Institutional investors also initiated the movement for more transparency through carbon disclosure via the Carbon Disclosure Project (PWC, 2008). Furthermore, it was institutional investors, collectively managing US$4 trillion of assets, who signed on to the UN Principles for Responsible Investment.

By synthesizing the earlier literature and professional reports to compare the ownership structure of USA and UK companies, Aguilera *et al.* (2006) found that institutional investors played an important role in distinguishing company's socially responsible actions. Therefore, sustainability information appears to have considerable decision usefulness to institutional investors (Sinclair-Desgagné and Gozlan, 2003) in making and evaluating

investment decisions and in turn institutional ownership can have significant influence on level of sustainability reporting and assurance.

H3. A higher percentage of institutional investor ownership is associated with enhanced sustainability reporting.

External influences: the role of media

Another external pressure is generated through media exposure. More media exposure means the corporation will counteract that exposure with its own stories through its sustainability reporting (Cormier and Magnan, 1999, 2003; Bewley and Li, 2000; Neu *et al.*, 1998). Companies in high-polluting activities are more likely to receive criticism for their operations (Bewley and Li, 2000; Herremans *et al.*, 1993).

Therefore, the external pressures (e.g. institutional pressure and media exposure) must be considered in studying what motivates sustainability reporting and we present the following hypothesis:

H4. Greater negative media visibility is associated with enhanced sustainability reporting.

We limited our study to only two external pressure variables: media and institutional ownership. Future research can benefit from using additional variables to measure external pressures such as pressure from non-governmental organizations or past and present environmental litigations against the company.

Data and measures

Empirical context and sample

Because of the existence of greater external pressures on companies in high-polluting industries, we chose a sample of companies who are required to report greenhouse gas (GHG) emissions to test our hypotheses. In 2004, the largest industrial GHG emitters operating in Canada began to report their emissions under the Greenhouse Gas Emissions Reporting Program. Largest emitters are defined as facilities with at least 100,000 tons per year of carbon dioxide (CO_2) equivalent (e) emissions.

We have used data made publicly available by the Government of Canada on GHG emissions for years 2004-2008. Data collection is limited to these years, as the regulation has been changed for the reporting of 2009 emissions, which requires facilities that emit 50,000 tons of CO_2e to report their emissions. We collected data for years 2004 to 2008, which provided 61 public companies that had consistently reported their GHG emissions for the sample period. The sample selection process led to 305 firm-year observations. Input data for the indices used in our study were collected by content analyzing publicly available data from companies' Web sites, annual reports and sustainability reports. Data for the financial variables used in our study were collected from Compustat and Capital IQ databases. We used listwise deletion to handle missing data. As we used multiple sources for data collection, there were missing data points for 67 firm-year observations.

The industries required to report to Environment Canada and therefore included in our final sample are the following: manufacturing, mining, chemicals, energy, forestry/pulp and paper and pipelines. This ensured that we were investigating a sample of companies in resource-intensive industries with high external pressures all having one aspect of performance publicly available. Not all industries and firms have the same degree of external motivation for public disclosure. Therefore, we expect the institutional investors and the media exposure variables capture the variations in external pressure that companies in different industries are facing.

Model specification

We used multiple regressions to test which variables would have significant influence on sustainability reporting. Our specified model is followed with a discussion of individual variables used.

$$RepIn_{it} = \beta_0 + \beta_1 BoD_{it} + \beta_2 Med_{it} + \beta_3 InstOwn_{it} + \beta_4 ISO_{it} + \beta_5 GHG_{it} + \beta_6 CAPR_{it} + \beta_7 TOBQ_{it} + \beta_7 ROA_{it} + \beta_8 LEV_{it-1} + \beta_9 SIZE_{it-1} + \beta_{10} PNEW_{it-1} + \beta_{11} CAPSP_{it-1} + \beta_{12} INDUST_{it} + \varepsilon_i$$

Where,

$RepIn_{it}$ (Sustainability Reporting Index) = Index consisting of determinants of enhanced sustainability reporting and assurance of firm i in year t.

BoD_{it} (Board of Directors' Responsibilities) = Index of firm i board of directors' responsibilities for social and environmental issues in year t.

Med_{it} (Negative Media) = number of negative news divided by the total positive and negative news published on firm i in year t.

$InstOwn_{it}$ (Institutional Investors) = percentage of firm i's shares owned by institutional investors in year t.

ISO_{it} (ISO 14001 EMS) = existence of ISO 14001 by firm i in year t.

GHG_{it} (Scaled GHG) = GHG emission divided by net sales of firm i in year t (GHG emissions per $ of sales).

$CAPR_{it}$ (Capital Raised) = the amount of debt or equity capital raised by the firm i in the fiscal year t = (sale of common and preferred shares − the purchase of common stock and preferred shares + long-term debt issued − the long-term debt reduction) in year t/size of total assets at the end of the fiscal year $t-2$.

$TOBQ_{it}$ (Tobin's Q) = market value of common equity + book value of preferred stock + book value of long-term debt and current liabilities in year t/book value of total assets for year t.

ROA_{it} (Return on Assets) = income before extraordinary items in year t/total assets at the end of fiscal year $t-1$.

LEV_{it-1} (Leverage) = total debt at the end of fiscal year $t-1$/total assets at the end of fiscal year $t-1$.

$SIZE_{it-1}$ (Log of Assets) = dummy variable for the natural logarithm of the total asset value measured as of the end of fiscal year $t-1$. Size takes 1 if the natural logarithm of the total asset is higher than the median of the sample, otherwise zero.

$PNEW_{it-1}$ (Plant Newness) = net properties, plant and equipment at the end of fiscal year $t-1$/by the gross properties, plant and equipment at the end of fiscal year $t-1$.

$CAPSP_{it-1}$ (Capital Spending Intensity) = capital spending in year $t-1$/by total sales revenues in year $t-1$.

$INDUST_{it}$ (Industry) = 1 if firm i belongs to the oil and gas industry and zero if otherwise.

Dependent variable

There are multiple avenues for reporting sustainability aspects such as Web sites, annual reports and stand-alone sustainability reports. Due to the voluntary nature of sustainability reporting, companies use different means to report their performance. Some companies put more emphasis on the social aspect, while others put more emphasis on the environmental aspect of reporting. Yet, other companies have a balanced view about reporting social, environmental and economic aspects and may use a combination of channels. Our interest in this research is to determine whether strategic and operational controls lead to enhanced reporting. For this reason, we used a broad-based measure of reporting (based on the well-recognized GRI guidelines), not a specific aspect of environmental or social disclosure. As our sample was selected based on the perceived demand for reporting due to involvement in high-polluting industries, our dependent variable needed to accommodate a variety of sophistication in reporting from none to a GRI externally reviewed report. The general progression in reporting starts with the company posting a few policy statements and plans on its Web site. It then advances to providing some convenient quantitative indicators or qualitative discussion about the outcomes of those actions. From there, the company will attempt a stand-alone report, often with metrics that are readily available in the company's information system. As the information system becomes more developed, the company may move to a GRI-level report. Finally, when information systems are sufficiently rigorous, the company will seek some form of external assurance (KPMG, 2011).

Therefore, we created an index for sustainability reporting to mirror this progression from a narrow definition to enhanced definition of reporting. Trained research assistants content analyzed companies' Web site, annual reports and sustainability reports to collect data for the reporting index. The research assistants had experience or education in social and environmental reporting and also attended training sessions held by one of the authors to ensure accuracy and consistency in the content analysis. The data were further validated by two of the authors each reviewing a sample of data for 10 companies, with no major changes necessary.

Our index is unlike research which content analyzes the number of topics reported and thus provides points for each topic reported. Due to the nature of our sample and the diversity in reporting, this conventional type of index was inappropriate. In contrast, our index considered the following characteristics which represent a continuum of less sophisticated to more sophisticated reporting, which proxies for the range of relevance and usefulness in reporting.

If the Web site included a company's stated policy, mission or strategy about sustainability, we assigned one point; if the Web site included quantitative indicators or qualitative results of sustainability performance, we assigned one point; we assigned one point to each social, environmental and economic aspects of performance if such indicators were provided in a stand-alone sustainability report; if the company used GRI, we assigned one point; and finally we assigned one point if the information provided in the sustainability reports was assured by external parties. Thus, the maximum attainable value for this index is 7.

Explanatory variables

Board of directors' responsibility. We created a governance index for board of directors' responsibilities for social and environmental issues. We identified board responsibilities through a content analysis of publicly available data, primarily Web sites and management circulars/proxy statements, and then assigned one point for each responsibility, ranging from ensuring compliance with laws (narrowest) to reviewing the entire sustainability report (broadest). We used the same content analysis procedures that we used for the Sustainability Reporting Index.

Our index included the following 11 potential responsibilities for boards with social and environmental committees: complies with laws and regulations, complies with industry standards, complies with company policy (environmental social responsible, ethics), reviews internal controls or environment management systems, reviews internal reports (management), monitors emerging trends or current issues, has stated social and environmental targets and goals, addresses community issues/concerns and stakeholders concerns, reviews external reports (audit), reviews communications related to any part of sustainability and reviews the sustainability, environment, social reports to external stakeholders.

Certified EMS. As discussed earlier, previous studies have echoed the importance of an EMS for environmental performance (Clarkson *et al.*, 2008; Klassen and McLaughlin, 1996). Despite the importance of systems for corporate strategic decisions, few studies have investigated the effects of corporate sustainability/EMSs and certified EMSs on sustainability reporting. ISO 14001 is part of international ISO Standards that have been developed to help companies in diminishing their negative impact on the environment. This standard has been developed to assist companies in designing an EMS that facilitates achieving a firm's environmental goals. We have therefore used a dummy variable to measure the existence of ISO 14001 in our sample of firms.

Institutional ownership. Socially responsible investing is no longer of interest to just a small group of special investors. Rather it is now a philosophy that is increasingly offered by mainstream investment companies, such as Goldman Sachs (i.e. GS Sustain). These companies are creating special products to meet the needs of investors. As well, environmentally and socially responsible practices are being demanded by a large proportion of institutional investors (Sparkes and Cowton, 2004) who can influence corporate actions (David *et al.*, 2007). We have measured this variable by determining the percentage of outstanding shares owned by institutional investors.

Negative media visibility. Consistent with the earlier studies (Cormier and Magnan, 2003; Neu *et al.*, 1998), we have used the intensity of negative media exposure to determine external pressures for reporting. For each year of our study, we collected both positive and negative newspaper articles published on social and environmental issues about each company in two sources: *Globe & Mail* (a leading business newspaper in Canada) and *The Wall Street Journal* (a leading business newspaper in the USA). We then divided the total number of negative articles by the total number of news articles (both positive and negative) published in both newspapers.

Control variables

Consistent with previous work, we controlled for several other variables.

GHG emission. Sustainability performance can influence sustainability reporting; therefore, we include a control variable to account for the variance that could occur due to the company's performance. However, this variable is a control variable only. It is not the intent of our research to investigate inconsistent findings in the literature regarding the relationship between reporting and performance. Some researchers (Neu *et al.*, 1998) have found a negative relationship between performance and disclosure, and others (Al-Tuwaijri *et al.*, 2004; Clarkson *et al.*, 2008) found a positive relationship between performance and reporting. We recognize that the reporting of GHG emissions is not an exact science. However, because it is difficult to find a performance variable that is available cross-sectionally in high-polluting industries, we looked to the Government of Canada GHG reporting requirements. We combined facility-level data to calculate company-wide emissions, providing 238 firm-year observations. We then scaled the amount of emission by total sales. Scaling by total revenues is a common practice in earlier research (for example, see Aguilera-Caracuel *et al.*, 2012) to capture the magnitude of the emissions.

Financing. Companies try to mitigate information asymmetry when they rely on capital markets (Frankel *et al.*, 1995; Gibbins *et al.*, 1990) to decrease the risk and, therefore, their

cost of capital (Botosan, 1997). Studies have argued that reliance on capital markets for raising capital is associated with sustainability reporting (Cormier and Magnan, 1999; Cormier and Gordon, 2001). To account for the possible effects of this association, we have controlled for the amount of debt or equity financing by a firm and then scaled it by dividing the amount by total assets.

Tobin's Q. Consistent with the study of Clarkson *et al.* (2008), we use Tobin's Q as a proxy for information asymmetry. Tobin's Q has been measured by market value of equities scaled by book value of total assets.

Return on assets. Better financial performing firms might have more financial resources to report their social and environmental performance. Lang and Lundholm (1993) found that companies with better financial performance have a higher inclination to release good news to capital markets. We have measured ROA using income before extraordinary items divided by total assets at the end of last year.

Leverage. Voluntary disclosure might increase as a result of an increased demand for monitoring information when debt increases (Leftwich *et al.*, 1981). Leverage has been determined as the ratio of total debt to total assets.

Size. Larger firms might have enhanced voluntary disclosure as a result of benefiting from economies of scale in information production costs (Lang and Lundholm, 1993). Many of the earlier studies (Deegan and Gordon, 1996, Patten, 1992) have found a significant relationship between company size and environmental reporting or disclosure. We have therefore controlled for this variable by taking the natural logarithm of total assets at the end of the period prior to the year of our study.

Age of property plant & equipment. Clarkson *et al.* (2008) argued that firms with newer and cleaner technology might have better environmental performance and, hence, would have a higher propensity to inform their stakeholders about their environmental performance. Therefore, we have controlled for the age of equipment by using a ratio of net property, plant and equipment by gross property, plant and equipment called Plant Newness; the higher the ratio, the newer the plant and related facilities.

Capital spending. In a similar way, companies with a higher level of capital expenditure are more inclined to disclose their environmental performance to their stakeholders. To control for the possible effects of capital expenditure on social and environmental reporting, we have used the ratio of capital expenditure to total sales and call the variable capital spending intensity; the higher the ratio, the higher the capital intensity.

Industry membership. Considering the high proportion of oil and gas companies to other companies in Canadian extractive industries, we test whether firms in our sample that belong to the oil and gas industry behave differently than other firms in the sample. We use a dummy variable to capture this effect.

Results

Descriptive statistics

Descriptive statistics and Pearson correlations for the variables of interest are presented in Table I. As can be observed in Table I, our descriptive statistics suggest that the Sustainability Reporting Index (*RepIn*) for the firms used in our sample range from zero to seven with a mean of 2.06. Minimum of zero indicates that there are some firms that choose to report their GHG emissions, fulfilling the mandatory government reporting requirement, while not selecting the broader-based, more transparent avenues of voluntary reporting, such as through Web sites and stand-alone sustainability reports. A maximum of seven indicates that there are firms that have enhanced reporting by selecting all possible means of reporting their social and environmental performance and have such information assured by external parties.

Table I Descriptive statistics: summary Statistics

Variable	N	*Mean*	*Median*	*SD*	*Minimum*	*Maximum*
RepIn	238	2.06	2.00	2.07	0.00	7.00
BoD	238	4.54	4.00	2.62	0.00	9.00
Med	238	0.11	0.00	0.26	0.00	1.00
InstOwn	238	0.27	0.30	0.14	0.00	0.67
ISO	238	0.81	1.00	0.39	0.00	1.00
GHG	238	411.16	82.76	1092.16	0.00	10059.38
CAPR	238	390.34	59.45	1716.50	−5234.00	11098.00
TOBQ	238	1.36	1.20	0.93	0.44	12.39
ROA	238	0.06	0.06	0.11	−0.48	0.95
LEV	238	0.26	0.24	0.14	0.00	0.74
SIZE	238	0.50	0.50	0.50	0	1.00
PNEW	238	0.60	0.61	0.15	0.16	0.98
CAPSPN	238	0.21	0.09	0.28	0.01	2.38
INDUST	238	0.53	1.00	0.50	0	1.00

Our analysis on the Board of Directors' Responsibilities Index (*BoD*) reveals that the score ranged from zero to nine with a mean of 4.54. A score of 0 indicates that there was no stated responsibility, and a score of 9 indicates the maximum level of board social and environmental responsibility exists through a special committee with these terms. The maximum score of nine represents 81 per cent of the possible score of 11.

Negative Media (*Med*) ranged from 0 to 1 with a mean of 0.11. A value of 0 on this variable shows that there was no negative information on the sample firms appearing in the *Globe & Mail* or the *Wall Street Journal* during the years of our study. Value of 1 indicates that all the information published on the firm was negative.

In regard to institutional ownership (*InstOwn*), the minimum was 0, and the maximum was 67 per cent, with a mean of 27 per cent, representing the percentage of shares owned by institutional investors.

ISO (ISO Certified EMS) is a dummy variable and shows an average of 0.81. This high average shows that about 81 per cent of the firms in our sample had implemented ISO 14001. But it is also significant that almost 20 per cent of our sample firms did not implement ISO 14001, considering that they are all in high-polluting industries with some facilities emitting emissions of over 100,000 tons of CO_2e per year.

Scaled by sales, GHG emissions (*GHG*) ranges from 0 to 10,059 tons with an average of 411 tons per dollar of sales. A minimum of zero might seem counter intuitive, as our sample includes all the companies that reported their GHG emissions. However, when we scale the GHG emissions by total sales, some companies had a scaled amount close to zero.

Finally, a cursory look at the descriptive statistics on the control variables does not show necessity for any further discussion on the variables presented in Table I.

Table II reports the Pearson correlations for the variables of interest. The correlation coefficients do not indicate potential multicollinearity problems, as all the correlation coefficients are less than 0.90. The highest correlation coefficient is between *INDUST* (Industry) and *PNEW* (Plant Newness) which is 0.42. However, variables such as *BoD* (Board of Directors' Responsibility), *Med* (Negative Media), *InstOwn* (Institutional Ownership), *ISO* (ISO certified EMS), *ROA* (Return on Assets) and *Size* are all significantly and positively correlated with our dependent variable, (*RepIn*) Sustainability Reporting Index. *Leverage* and *GHG* emissions are both significantly and negatively correlated with Sustainability Reporting Index at an alpha level of 0.05 and 0.10, respectively.

Hypotheses testing

Regression results for our specified model are presented in Table III. The results indicate that the model provides a good fit with an R^2 of 0.437, and an adjusted R^2 of 0.405 with an

Table II Descriptive statistics: correlations

Variable	*RepIn*	*BoD*	*Med*	*InstOwn*	*ISO*	*GHG*	*CAPR*	*TOBQ*	*ROA*	*LEV*	*SIZE*	*PNEW*	*CAPSPN*	*INDUS*
RepIn	1.00													
BoD	0.32*	1.00												
Med	0.35*	0.20*	1.00											
InstOwn	0.13**	0.10***	0.04	1.00										
ISO	0.30*	0.24*	0.09***	0.02	1.00									
GHG	−0.08***	−0.10***	0.07	−0.13**	−0.17*	1.00								
CAPR	0.05	0.14**	0.13**	−0.09	0.06	−0.07	1.00							
TOBQ	0.07	0.00	0.05	−0.13**	−0.07	0.02	−0.05	1.00						
ROA	0.20*	0.06	0.13**	−0.06	0.05	−0.23*	0.02	0.20*	1.00					
LEV	−0.13**	0.03	−0.11**	0.04	0.24*	−0.02	0.08***	−0.32*	−0.34*	1.00				
SIZE	0.52***	0.23***	0.24***	0.02	0.16**	−0.29**	0.13*	0.10	0.19*	−0.21*	1.00			
PNEW	−0.04	0.14**	0.06	0.14**	0.05	−0.16*	0.19*	−0.07	0.22*	0.22*	0.10	1.00		
CAPSPN	−0.08	−0.17*	−0.01	0.09	−0.26*	−0.11**	0.08***	0.00	0.06	−0.04	0.02	0.28*	1.00	
INDUST	0.13*	0.02	0.30***	0.02	0.00	−0.05	0.03	0.07	0.19*	−0.11	0.36**	0.42***	0.40***	1.00

Notes: *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table III Regression results

Variables	*Prediction*	*Coefficient*	t-*values*	p-*values*	*VIF*
Intercept		−0.129	−0.217	0.829	
BoD	+	0.115	2.645	0.009	1.208
Med	+	1.625	3.664	0.000	1.233
InstOwn	+	1.869	2.463	0.015	1.104
ISO	+	1.112	3.704	0.000	1.291
GHG	+/−	0.000	1.892	0.060	1.264
CAPR	+	0.000	−0.594	0.553	1.128
TOBQ	+	0.041	0.346	0.730	1.146
ROA	+	2.852	2.458	0.015	1.397
LEV	+	0.110	0.117	0.907	1.562
SIZE	+	1.851	7.394	0.000	1.463
PNEW	+	−1.782	−2.055	0.041	1.614
CAPSPN	+	0.461	1.034	0.302	1.450
INDUST	+/−	−0.380	−1.358	0.176	1.820
R^2		0.437			
Adjusted R^2		0.405			
F		13.396 ($p < 0.001$)			
Durbin-Watson		1.693 (not significantly different from 2:00, given a sample size of 238)			
Highest VIF		1.820 (No indication of multicolinearity)			
Highest condition index		19.706 (Lower than the 30 level for severe multicolinearity)			

F coefficient of 13.396 (significance < 0.001 level). *BoD* (Board of Directors' Responsibilities), *Med* (Negative Media), *ISO* (ISO Certified EMS) and *Size* (significance < 0.01 level), *InstOwn* (Institutional Ownership) and *ROA* (Return on Assets) (significance < 0.05 level) have significant positive impacts on the dependent variable, *RepIn* (Sustainability Reporting Index). *GHG* (significance < 0.10 level) has a marginal significant positive impact on *RepIn*. *PNEW* (significance < 0.05 level) has significant negative impacts on *RepIn*. *CAPR* (Capital Intensity), *TOBQ* (Tobin's Q), *LEV* (Leverage) and *CAPSP* (Capital Spending) were not found to have significant impacts on our dependent variable. Although our sample data were collected only from high-polluting industries, we did check for an industry effect. The results of our analysis did not reveal any significant differences between oil and gas sector and other sectors.

We also checked for the existence of possible multicollinearity by investigating the variance inflation factor (VIF) and condition index statistics. The highest VIF in our sample is only 1.82, contributed by Industry, which is much lower than the rule of thumb of 10. The highest Condition Index was 19.706. Therefore, the analysis does not reveal any possible multicollinearity among the variables of our study.

In summary, we found support for all of our hypotheses, thus indicating that both external motivating and internal facilitating variables support enhanced reporting. *H1* and *H2* tested the importance of internal micro-organizational factors that facilitate reporting. *H3* and *H4* tested the importance of external pressures that motivate reporting. Regarding facilitating variables, companies with broader responsibilities for the special committee of the board of directors and with ISO Certified EMSs are more likely to provide enhanced sustainability reporting and increased transparency. Regarding motivating variables, we found that companies with a higher percentage of institutional investor ownership and with greater exposure through negative media visibility are more likely to produce enhanced sustainability reporting, resulting in increased transparency.

Sensitivity tests

The results of our correlation analysis indicate that GHG emissions and our Sustainability Reporting Index are significantly and negatively correlated. However, after controlling for the effects of other variables in our equation, GHG is positively associated with the Index. This positive relationship is not deemed to be significant at the 0.05 alpha level. The contradictory results, evidenced also in the literature, may be due to an endogeneity problem caused by a loop of causality between sustainability reporting and performance. To investigate further, we undertook instrumental regression analysis, wherein the control variables were specified as endogenous to the Sustainability Reporting Index. This additional analysis dealt explicitly with the possibility that choices regarding the level of sustainability performance and the level of sustainability reporting may be synthesized as part of the same decision-making system and not made in isolation. In conducting this instrumental variables analysis, we used two-stage least squares regression. The results of this two-stage least squares analysis showed that taking into account, the possible endogeneity problem in our model had no impact on the significance or coefficient of the relationship between the hypothesized predictor variables and the dependent variable.

Discussion and conclusion

The extant research calls for more investigation into the role that internal factors play to facilitate corporate sustainability decisions (Howard-Grenville *et al.*, 2008) and the reporting of the outcome of those decisions (Adams and Larrinage-González, 2007; Adams, 2004), especially voluntary participation and reporting. Even though external pressures, such as institutional factors and media exposure, are strong motivators, they are insufficient by themselves to explain participation in voluntary reporting because companies react to these pressures differently (Herremans *et al.*, 2009). Therefore, our research design incorporated variables that are proxies for external pressures that motivate and internal controls that facilitate the reporting process.

We selected two variables within the organization that represent:

1. the highest level of strategic control: board of directors' responsibilities regarding sustainability disclosures; and
2. a control that should flow throughout all levels of the organization; namely, the organization's EMS (ISO certified).

To proxy for external pressures, we used two variables: negative media visibility and percentage of institutional investor holdings. We found that both variables are significant and that they motivate enhanced reporting and increased transparency.

Our findings support all of our hypotheses and, thus, contribute to the literature by showing the necessity of using a model which integrates both external motivators and internal facilitators when investigating sustainability reporting. Before a company can engage in greater transparency and produce an enhanced report (using a GRI externally assured

report as the upper level standard), it must have internal procedures and processes in place.

We limited our study to high-polluting industries to control for the variability that can be found among different sectors (Clarkson *et al.*, 2008). To determine the extent that both our external and internal factors influence reporting, we selected our sample companies from an Environment Canada database that provides required reporting for GHG emissions. We then investigated what would motivate and facilitate companies to disclose information beyond the regulatory requirements and the extent of their disclosure, using a report based on GRI standards for reporting and assurance as the highest standard.

Implications of our research

Given that more stakeholders are using, or wish to use, sustainability reporting and disclosure in their decision-making process, our research contributes to practice by recognizing the importance of internal characteristics in the reporting process. It is helpful not only to stakeholders reading the reporting but also to companies preparing the reports. Both want to have useful and credible reporting that has decision usefulness, especially in evaluating an organization's performance, even if it is a self-evaluation. If companies want to ensure quality of information in their reports, then they need to institute good strategic and operational controls. Report readers should look for a discussion of these characteristics to understand the context in which the report was created to determine the degree of reliability of the information provided. Both the internal factors that we used, a well-functioning management system and tone at the top coming from the board level, are well recognized as important for overall good business performance. Now, we also know that these factors result in enhanced sustainability reporting as well.

As the IIRC exists to take sustainability reporting to a higher standard and has suggested that both the operating context and internal elements are essential for enhanced reporting, we investigated both external pressures and internal capabilities and found both significant for providing enhanced reporting. Because the IIRC is building a framework for integration of environmental and social disclosures with financial disclosures, we call for research that investigates both internal variables and the external context to understand the importance of these characteristics for enhanced reporting.

Note

1. We use the term *sustainability* reporting to signify the disclosure of economic, environmental or social information, generally of a non-financial nature, that is provided through the company's Web site or in a stand-alone report. This term is consistent with the name of the GRI's sustainability guidelines. Other names that are frequently used for similar disclosure are corporate social responsibility, corporate citizenship, environmental, triple bottom line or social reports.

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