THE EVOLUTION OF CORPORATE REPORTING ON GHG EMISSIONS: A CANADIAN PORTRAIT

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Abstract

This paper examines the evolution of the extent to which firms with a high greenhouse gases (GHG) emission impact complied with Chartered Professional Accountants (CPA) Canada guidelines on climate change disclosures, as well as the factors that influenced these disclosures. The sample is comprised of Canadian firms in the mining, energy, and chemical sectors. The study measures the influence of the firms' political exposure and media visibility, their audit firm, the presence of an environment committee, their ownership structure, and their financial performance on their GHG emissions disclosures. Our findings show that these disclosures considerably evolved over the 10-year period from 2007 to 2017 and that this evolution was in the form of a leap rather than a slow and steady learning curve. We also confirmed the significant influence of the environment committee, political exposure, and media visibility on this evolution. Our empirical results corroborate the work of DiMaggio and Powell (1983), outlining the important role normative pressures play in voluntary GHG emissions disclosure firms make in order to secure the legitimacy conferred by society (Suchman, 1995).

Keywords: Corporate Social Responsibility, Corporate Governance, Corporate Reporting, Voluntary Disclosure, Legitimacy Theory, GHG Emissions

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1. INTRODUCTION

Climate change risks are a growing threat to corporations' financial performance. As a result, more and more executives are taking the impact of these risks into account in their calculations and financial statement users are paying closer attention to the issue (Aldy & Gianfrate, 2019; Harrast & Olsen, 2016). In 2008, CPA Canada issued two discussion reports entitled "Executive briefing: Climate change and related disclosures" (CPA Canada, 2008b) and "Building a better MD&A: Climate change disclosures" (CPA Canada, 2008a) to help financial statement users better understand the scope of climate change risks. CPA Canada's aim was to help executives preparing MD&As decide what information to disclose about the impact of climate change issues on their firm's management and financial performance.

Human activities are very likely responsible for the climate changes that are impacting oceans and the cryosphere (IPCC, 2019). According to the Intergovernmental Panel on Climate Change (IPCC), the living conditions of 670 million people living in high mountain regions and 680 million people in low-lying coastal areas are threatened by climate change (IPCC, 2019). Mainly caused by carbon dioxide, methane, and hydrofluorocarbons (GRI, 2016), climate change is a fundamental environmental issue that has major economic and social repercussions (CPA Canada, 2017).

Firms emitting greenhouse gases can be affected in a number of ways. From an economic perspective, they could see the demand for their products or services decrease, their operating costs increase and their reputation tarnished. They also run a greater risk of litigation and having to pay costs to defend their rights and possible penalties or fines. Stakeholders exposed to these risks must have access to information about firms' environmental performance so that they can understand the extent of the organizations' exposure to related financial risks (CPA Canada, 2017).

Since such information can reveal potential opportunities as well as significant risks, investors interested in accessing more extensive information about firms' GHG emission performance would like to see improved disclosures (Henderson, 2009). Various organizations devoted to standardizing corporate sustainability reporting, including the Global Reporting Initiative (GRI), the Carbon Disclosure Project, the Task Force on Climate-related Financial Disclosures, and the Sustainability Accounting Standards Board use their expertise to address this issue (Lovell & MacKenzie, 2011). Governments have also introduced various legislation and regulations to support firms making climate change disclosures. For example, in 2010, the Securities and Exchange Commission issued the Commission Guidance Regarding Disclosure Related to Climate Change, which led to a twofold increase in climate change disclosures by US firms between 2010 and 2014 (Harrast & Olsen, 2016).

A number of studies have attempted to assess corporations' contribution to climate change or to gauge their response to current legislation and regulations. Voluntary disclosures in annual reports have been one of the questions most frequently examined (Ball, Jayaraman, & Shivakumar, 2012; Depoers, 2000; Depoers, Jeanjean, & Jérôme, 2016; Garcia-Sanchez, Cuadrado-Ballesteros, & Frias-Aceituno, 2016; Guay, Samuels, & Taylor, 2016; Liu & Yang, 2018), with a focus on how those disclosures are driven by concerns with legitimation and image enhancement (Birkey, Michelon, Patten, & Sankara, 2016; Boiral & Henri, 2017; Cho, Michelon, Patten, & Roberts, 2015; Ho & Shun Wong, 2001; Klibi, Damak-Ayadi, Dridi, & M'Zali, 2020; Meng, Zeng, & Tam, 2013; Momin, Northcott, & Hossain, 2017). Prior research on voluntary disclosures can be broken down into three major categories:

1) studies examining the reasons firms make voluntary disclosures (Stocken, 2000);

2) studies relating to governance and voluntary disclosures (Al Fadli, 2020; Barako, Hancock, & Izan, 2006; Ben-Amar & McIlkenny, 2015; Ben-Amar, Chang, & McIlkenny, 2017; Deswanto & Siregar, 2018; Donnelly & Mulcahy, 2008; Eng & Mak, 2003; Ho & Shun Wong, 2001; Hollindale, Kent, Routledge, & Chapple, 2019; Kılıç & Kuzey, 2019; Konadu, 2017; Lovell & MacKenzie, 2011; Peters & Romi, 2014; Rupley, Brown, & Marshall, 2012; Sahore & Verma, 2019; Sun, Zhao, & Cho, 2019);

3) studies addressing firms' performance and the level of voluntary disclosures (Deswanto & Siregar, 2018; Griffin & Sun, 2013; Lee, Park, & Klassen, 2015; Plumlee, Brown, Hayes, & Marshall, 2015; Sun et al., 2019).

However, despite the recent rise in this level, few studies have explored how it has evolved over time.

The purpose of this study is therefore to 1) examine whether GHG emissions disclosures in 2017 differ from those reported in 2007 and 2) examine the influence of political exposure and media visibility, the audit firm, the presence of an environment committee within the board, ownership structure and financial performance on such disclosures. The study is based on the analysis of the information provided in the MD&A section of the annual reports of a sample of 53 Canadian firms active in the mining, energy, and chemical sectors listed on the Toronto Stock Exchange. Our analyses show that the level of voluntary GHG emissions disclosures made by high-carbon impact firms remained relatively stable from 2013 to 2017. However, a significant difference was noted when comparing our results to those of Berthelot and Robert (2011). In the 10-year period from 2007 to 2017, the level of voluntary GHG emissions disclosures at first increased significantly before levelling off. The presence of an environment committee, as well as political exposure and media visibility, were found to have the most influence over these disclosures. Our results further understanding of the mechanisms that operate when disclosure regulation is relatively soft. Our observations validate explanations offered by the legitimacy theory and the neo-institutional theory. In response to political and media pressure, firms disclose more greenhouse gas information. However, over time, organizations' disclosures seem to converge and plateau, which confirms their imitative behaviour and supports the neo-institutional theory. These two theories thus help explain organizations' voluntary GHG disclosure practices. Lastly, as well as contributing to theory, our results show that a relatively non-binding legislative environment does not encourage extensive disclosure.

The rest of this article is organized as follows. Section 2 reviews prior research. Section 3 describes the methodology and Section 4 sets out the study findings. Lastly, Section 5 presents the conclusion, the study's main limitations, and the scope for future research.

2. LITERATURE REVIEW

Climate change, which is one of the most important environmental issues of our time (Government of Canada, 2020), has significant environmental, social, political, and economic implications (CPA Canada, 2017). According to the IPCC, there is substantial evidence that human activities are leading to increased levels of GHG in the atmosphere (Pachauri et al., 2014). One of the key issues is the fact that over 70% of GHG emissions attributable to human activity are produced by a mere hundred or so firms in the fossil fuel industry (Griffin & Heede, 2017). Corporations are thus major players in the combat against climate change.

Well aware of the important questions climate change raises, a number of firms are seeking solutions to limit its impact. Many initiatives have therefore been introduced to help firms manage their GHG emissions. Various standard-setting initiatives, such as ISO 14000 and ISO 26000, the OECD guidelines, and the IFC's Sustainability Framework set out recommendations to help organizations implement formal systems to manage their environmental impact. The GRI has introduced the world's most widely used sustainability reporting standards, the GRI Standards (GRI, 2020). These standards help companies manage and report on their material environmental impacts by providing credible and comparable information (Henderson, 2009), including information on GHG emissions.

Regulatory bodies also play an active role in how organizations manage GHG emissions. In 2008, the Government of Canada introduced mandatory requirements for facilities in a range of industries to provide information on GHG emissions. Following this regulation, the Canadian Securities Administrators (CSA), whose role is to ensure that organizations understand environmental impacts, issued a notice to provide guidance to reporting issuers on existing continuous environmental disclosure requirements, including those respecting GHG emissions (CSA, 2010). CPA Canada then followed suit and issued two documents designed to more clearly explain the business implications of climate change (CPA Canada, 2008b). These publications offered broad guidance to firms required by the CSA National Instrument 51–102 Continuous Disclosure Obligations to disclose material facts, risks, and uncertainties relating to their operations, including the management of their GHG emissions, in their Management's Discussion and Analysis (MD&A) reports.

Despite this legislation, a majority of Canadian companies are not legally required to disclose information about their GHG emissions (Williams, 2018). According to neo-institutional theory, firms that do voluntarily disclose information about these emissions do so because of normative pressures exerted by institutions in their organizational fields (DiMaggio & Powell, 1983). Responding to these pressures enables organizations to move towards an isomorphism, which will grant them legitimacy by demonstrating the congruence between their behaviours and the institutions, symbols, values, and outputs deemed legitimate by their social environment (Deephouse, 1996; Dowling & Pfeffer, 1975; Meyer & Rowan, 1977).

According to Suchman (1995), legitimacy, which is "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (p. 574) is one of the most commonly used theories to explain voluntary disclosure (Aerts & Cormier, 2009). Strategic legitimacy theory suggests that organizations could, depending on the legal system and institutional characteristics of a given country, have some form of control over their perceived legitimacy (Filatotchev & Nakajima, 2014; Garcia-Sanchez et al., 2016; Walsh, Singh, & Malinsky, 2021). Organizations can make strategic choices in order to alter their legitimacy (Oliver, 1991), which is here seen as a resource that can be managed through voluntary disclosures.

Voluntary environmental disclosures are part of sustainability disclosures, which encompass the disclosure of economic, social, environmental, and governance information (de Villiers, Low, & Samkin, 2014; van Zijl, Wöstmann, & Maroun, 2017) in order to engage with stakeholders (Amran, Ooi, Mydin, & Devi, 2015; Liesen, Hoepner, Patten, & Figge, 2015). Releasing a CSR report is a sound strategy for firms in environmentally sensitive industries looking to improve their perceived legitimacy (Kuo & Yi-Ju Chen, 2013). It can also be used by larger companies to maintain their perceived legitimacy (Baum & Oliver, 1991; Deephouse & Carter, 2005), particularly those operating in emerging economies (Walsh et al., 2021).

Many studies examine the reasons why organizations voluntarily disclose environmental information and their impacts. Size and industry are two of the most widely cited determinants of voluntary disclosures. It appears that larger companies tend to disclose more environmental information on a voluntary basis (Borghei-Ghomi & Leung, 2013; Eng & Mak, 2003; Griffin & Sun, 2013; Habbash, Hussainey, & Awad, 2016; Janang, Joseph, & Said, 2020; Uyar, Kılıç, & Bayyurt, 2013), as do those in high environmental impact industries (Giannarakis, Konteos, Sariannidis, & Chaitidis, 2017; Habbash et al., 2016; Kuo & Yi-Ju Chen, 2013; Perez-Batres, Miller, Pisani, Henriques, & Renau-Sepulveda, 2012; Radhouane, Nekhili, Nagati, & Paché, 2017; Talbot & Boiral, 2018).

The impact of corporate governance is also important in explaining voluntary environmental disclosures, the content of which has been reported to be positively influenced by non-executive directors (Berthelot & Robert, 2011; Borghei-Ghomi & Leung, 2013; Donnelly & Mulcahy, 2008; Janang et al., 2020; Kılıç & Kuzey, 2019; Lim, Matolcsy, & Chow, 2007; Ben Rhouma, Ben Amar, & Ebondo Wa Mandzila, 2018; Rupley et al., 2012; Sahore & Verma, 2019; Uyar et al., 2013). As well, board characteristics such as gender diversity and the presence of a CSR committee have been positively associated with such disclosures (Al Fadli, 2020; Ben-Amar et al., 2017; García Martín & Herrero, 2020; Ho & Shun Wong, 2001; Hollindale et al., 2019; Janang et al., 2020; Kılıç & Kuzey, 2019; Konadu, 2017; Peters & Romi, 2014; Rupley et al., 2012; Samaha, Khlif, & Hussainey, 2015) and would appear to reflect corporate sustainability.

In terms of corporate governance, the qualities of the information disclosed are of major interest to researchers interested in voluntary environmental disclosures. From a theoretical perspective, Hummel and Schlick (2016) differentiate superior from poor sustainability performers, contending that the latter prefer low-quality sustainability disclosures in order to disguise their true performance and thereby protect their legitimacy. In a similar vein, de Villiers and van Staden (2011) found that firms facing an environmental crisis will disclose more environmental information on their website, in contrast to those with a poor environmental reputation, which will disclose more such information in their annual reports. Legitimacy conferred by voluntary disclosure allows tax aggressive companies to protect their perceived image of good citizenship (Lanis & Richardson, 2012). As well, although markets respond negatively to carbon disclosure information, firms can use proactive media coverage to mitigate its impact (Lee et al., 2015). Guay et al. (2016) suggest that voluntary disclosure helps attenuate the negative effect of complex financial statements on the information environment. Voluntary disclosure could also boost firm value through expected future cash flows and cost of equity capital (Plumlee et al., 2015).

A number of studies on the effects of voluntary disclosures on organizations explore the relationship between performance and the volume of voluntary corporate disclosures. One hypothesis is that the higher a firm's financial performance, the more it tends to disclose information on its environmental performance (Borghei, Leung, & Guthrie, 2018; Russo & Fouts, 1997). Although not all the studies reach the same conclusion, they all note a positive relationship between firms' financial performance and the amount of environmental information released to investors (Borghei et al., 2018; Deswanto & Siregar, 2018; Hummel & Schlick, 2016; Ory & Petitjean, 2014; Radhouane, Nekhili, Nagati, & Paché, 2017, 2019; van Zijl et al., 2017).

Even though environmental concerns are increasingly important to investors, because they are fairly recent, few studies have as yet examined the evolution of the relationships noted in prior research. Furthermore, since it has also been observed that firms with good environmental performance are more likely to make environmental disclosures, it would be particularly interesting to explore the evolution of voluntary disclosures by firms in sectors known to be highly polluting. For instance, in 2016, the Canadian oil and gas sector was deemed to be the greatest source of GHG emissions, accounting for 26% of all Canadian emissions (Statistics Canada, 2018). With this in mind, this study provides a portrait of the evolution of voluntary environmental disclosures over a 10-year period and determines to what extent the evolution of corporate voluntary disclosures is influenced by firms' characteristics.

3. RESEARCH METHODOLOGY

Since one of our objectives is to provide a portrait of the evolution of voluntary environmental disclosures, we replicated the methodology used by Berthelot and Robert (2011). We analysed the information provided on GHG emissions in the MD&As of the annual reports of Canadian firms active in the mining, energy, and chemical sectors from 2013 to 2017[1]. This allows us to compare our results with those Berthelot and Robert (2011) obtained for the year 2007 and identify trends in the corporate reporting evolution of GHG emissions. As part of the annual report, the information disclosed in the MD&A is overseen by the National Instrument 51–102 Continuous Disclosure Obligations issued by the CSA. This confers credibility to the information collected in our study. These industries were selected because they are major emitters of GHG (Perez-Batres et al., 2012). The decision was made to limit the sample to these three industries because firms operating in these sectors have to respond to greater pressure and their stakeholders exhibit a certain level of scepticism (Aerts & Cormier, 2009; Kanso & Gonzales, 2015). Since their GHG emission disclosures are largely voluntary, the information reported is not easily verifiable. This can impact the firms' financial performance since the stakeholders will assess the disclosures' validity according to general industry behaviour rather than that of a particular firm (King, Lenox, & Barnett, 2002).

The study period was chosen because the 2017 fiscal year report enabled us to compare GHG emissions disclosures over a 10-year period, that is, from 2007 to 2017. By comparing our data collected from 2013 to 2017 with that collected by Berthelot and Robert (2011) in 2007, we can analyse the evolution of voluntary GHG emissions disclosures over the 10-year period from 2007 to 2017.

3.1. The sample

To be included in the sample, the firms had to meet the following criteria: 1) produce oil, gas, or chemicals or operate mines; 2) have their head office in Canada; 3) be listed on the Toronto Stock Exchange; and 4) have their annual reports from 2013 to 2017 available on the SEDAR database or their own website. All the firms that met these criteria are included in the sample. The final sample is comprised of 53 Canadian firms in the energy, chemicals, or mining sectors (see Appendix).

3.2. Data treatment and analysis

The model developed by Berthelot and Robert (2011) was used to measure GHG emission disclosures to ensure the comparability of results. This model is based on the corporate GHG emission disclosure recommendations issued by CPA Canada in 2008. The CPA Canada guide recommends that firms disclose information about the risks, strategies, key performance drivers, and impacts and results of their activities (CPA Canada, 2008a). Our study uses these indicators to measure voluntary disclosures. All data was collected by hand.

In line with earlier studies (Dowell, Hart, & Yeung, 2000; Karagiorgos, 2010; Ory & Petitjean, 2014; Radhouane et al., 2017, 2019), Tobin's Q was used to measure the firms' financial performance. This ratio allows us to investigate the relationship between market valuation and intrinsic value, as did Berthelot and Robert (2011).

3.3. Other variables

As in Berthelot and Roberts' study (2011), the other variables were measured as follows:

- *Political exposure* was measured by the firms' total assets.
- *Media visibility* was measured by the number of times the firm was mentioned in *The Globe and Mail*[2] between 2013 and 2017.
- *The size* of the audit firm: (1) if it is one of the Big Four, (0) otherwise.
- *The presence* of an environment committee within the board of directors: (1) presence or (0) absence.

[1] The evolution of disclosures could have been examined via other types of disclosures such as separate sustainability reports or a database such as that of the Carbon Disclosure Project (CDP). However, voluntary disclosures in sustainability reports heve been documented by Talbot and Boiral (2018) for their lack of consistency and the CDP database is not intended to inform a large body of stakeholders and is not as accessible as companies' annual reports.

[2] *The Globe and Mail* is the newspaper with the largest circulation in Canada.

Ownership structure was determined by identifying the sample firms' principal shareholders between 2013 and 2017. A firm that mentioned the presence of a shareholder holding more than 10% of the voting shares was considered to be a closely held ownership firm (1); one that did not was considered to be a widely held ownership firm (0).

4. RESULTS

Table 1 shows the evolution of the firms' GHG emission disclosures according to the five indicators included in CPA Canada's guidelines on GHG emissions. Information on the risk associated with GHG emissions regulation is among the most commonly disclosed. Our findings show that 60.4% of the firms in our sample identify the regulatory framework governing them and 34% disclose details about this framework. These findings indicate that firms are aware of the risks of non-compliance with GHG emissions regulations.

Disclosures on GHG emissions management strategies are less common; close to one firm in three makes no mention of them. However, the percentage of firms that disclose their GHG emissions management strategies and their targets steadily increased over the five years under study, climbing from 1.9% to 11.3%. The firms that comply with CPA Canada's most demanding expectations respecting disclosures on the integration of GHG emissions in their organizational strategy serve as beacons and examples for their competitors.

Few firms disclose key performance indicators linked to their GHG emissions. In fact, 75% disclose no information at all about key performance indicators, while 18% mention just one or two. It is understandable that firms are not yet measuring and accounting for their organizational performance respecting GHG emissions since GHG management is not yet an integral part of this performance.

However, firms do see the impact of GHG emissions regulation on their operations. In fact, over 81% disclose this information. Coercive pressures seem to strongly influence the operations of Canadian firms, many of which make these types of disclosures. Since the restrictions imposed by GHG regulation affect corporate activities, the majority of firms are inclined to disclose these impacts.

As to disclosure of the results of GHG emissions reduction strategies, our findings show that 41.5% of the firms provide this information, indicating that organizations are making an effort to reduce their carbon footprint and wish to benefit from the positive impact of the results obtained. Accordingly, many firms make voluntary disclosures in this respect. Table 1 presents all these results.

Table 1. GHG emission disclosures (2013–2017)

Variable	*Value*	*% of firms*				
Risks		*2013*	*2014*	*2015*	*2016*	*2017*
The firm does not disclose information on the risks related to GHG emissions reduction regulations.	0	-	-	1.9	-	-
The firm discloses a general statement that its GHG emissions must now be managed as required by regulation.	1	41.5	43.4	41.5	39.6	39.6
The firm discloses the name of the regulation that requires it to manage its GHG emissions.	2	22.6	22.6	22.6	26.4	26.4
The firm discloses the name of the regulation that requires it to manage its GHG emissions and provides details on the regulation.	3	35.9	34	34	34	34
Strategies						
The firm does not provide any information on its strategies to manage its GHG emissions.	0	34	28.3	30.1	34	35.9
The firm mentions that it has strategies to manage GHG emissions without explaining them.	1	30.1	35.9	34	32	26.4
The firm mentions and explains its strategies to manage its GHG emissions.	2	34	30.1	28.3	30.1	26.4
The firm explains its strategies to manage its GHG emissions and discloses specific targets to achieve.	3	1.9	5.7	7.6	3.9	11.3
Key performance drivers						
The firm does not disclose any information on key performance drivers.	0	79.3	75.5	79.3	77.4	75.5
The firm mentions its key performance drivers in respect of GHG emissions.	1	15.1	20.8	17	17	18.9
The firm mentions and explains its key performance drivers in respect of GHG emissions.	2	5.6	3.7	3.7	5.6	5.6
Impact						
The firm does not disclose any information on the impact of GHG emissions regulation on its operations.	0	22.6	18.9	18.9	18.9	18.9
The firm mentions the impact of GHG emissions regulation on its operations.	1	60.4	62.2	62.2	64.1	60.4
The firm mentions and explains the impact of GHG emissions regulation on its operations.	2	17	18.9	18.9	17	20.7
Results						
The firm does not disclose the results of the implementation of strategies to reduce GHG emissions.	0	62.3	58.5	64.2	62.3	58.5
The firm discloses the results of the implementation of strategies to reduce GHG emissions.	1	37.7	41.5	35.8	37.7	41.5

Following this overview of current voluntary GHG disclosure practices, we now examine how the situation has evolved over a 10-year period, comparing our findings with those of Berthelot and Robert (2011). Table 2, which presents the evolution of disclosures from 2007 to 2017, shows a significant increase in their scope during these years. Within this 10-year period, 58% of the firms began to make disclosures on risks associated with GHG reduction regulation; 44% began to disclose information on their strategies; 25% began to disclose information on their key performance drivers; 47% began to disclose information on the impact of GHG emissions regulation, and 35% began to disclose information on the results of their strategies.

Table 2. Comparison of GHG emission disclosures (2007 vs. 2017)

Variable	*Value*	*% of firms*	
Risks		*2007*	*2017*
The firm does not disclose information on the risks related to GHG emissions reduction regulations.	0	57.8	0.0
The firm discloses a general statement that its GHG emissions must now be managed as required by regulation.	1	12.5	39.6
The firm discloses the name of the regulation that requires it to manage its GHG emissions.	2	6.3	26.4
The firm discloses the name of the regulation that requires it to manage its GHG emissions and provides details on the regulation.	3	23.4	34
Strategies			
The firm does not provide any information on its strategies to manage its GHG emissions.	0	79.7	35.9
The firm mentions that it has strategies to manage GHG emissions without explaining them.	1	3.1	26.4
The firm mentions and explains its strategies to manage its GHG emissions.	2	12.5	26.4
The firm explains its strategies to manage its GHG emissions and discloses specific targets to achieve.	3	4.7	11.3
Key performance drivers			
The firm does not disclose any information on key performance drivers.	0	100	75.5
The firm mentions its key performance drivers in respect of GHG emissions.	1	-	18.9
The firm mentions and explains its key performance drivers in respect of GHG emissions.	2	-	5.6
Impact			
The firm does not disclose any information on the impact of GHG emissions regulation on its operations.	0	65.6	18.9
The firm mentions the impact of GHG emissions regulation on its operations.	1	34.4	60.4
The firm mentions and explains the impact of GHG emissions regulation on its operations.	2	-	20.7
Results			
The firm does not disclose the results of the implementation of strategies to reduce GHG emissions.	0	93.8	58.5
The firm discloses the results of the implementation of strategies to reduce GHG emissions.	1	6.2	41.5

Table 3 presents the descriptive statistics for all the continuous variables. The first variable of interest is the disclosure score, the mean of which continued to increase from 2013 to 2017, rising from 4.57 to 4.81. Furthermore, despite the relatively homogenous nature of our sample, the firms examined differ significantly in terms of their political exposure, media visibility, and financial performance.

Table 3. Descriptive statistics for continuous variables (53 firms)

Year	*Mean*	*Stand. dev.*	*Median*	*Minimum*	*Maximum*
Disclosure score					
• 2013	4.57	2.38	4	1	10
• 2014	4.74	2.41	5	1	10
• 2015	4.62	2.39	5	1	10
• 2016	4.62	2.37	5	1	10
• 2017	4.81	2.53	5	1	10
Political exposure — assets (in millions of CAD$)					
• 2013	8893.9	15502.3	2052.8	4.2	78315
• 2014	9787.4	16437.3	2929.6	6.1	79671
• 2015	9475.6	16003.1	2781	1.2	77527
• 2016	9429.9	16783.5	2711.3	0.3	88702
• 2017	10008.1	18203.6	2658.2	9.8	89494
Media visibility (number of articles)					
• 2013	6.58	16	0	0	78
• 2014	6.89	16.66	0	0	96
• 2015	6.83	19.66	0	0	127
• 2016	4.13	11.19	0	0	74
• 2017	4.79	7	1	0	20
Financial performance (Tobin's Q)					
• 2013	1.15	0.77	0.94	0.08	4.25
• 2014	0.91	0.51	0.80	0.33	2.89
• 2015	0.69	0.32	0.66	-0.04	1.49
• 2016	0.90	0.47	0.82	0.00	1.96
• 2017	0.81	0.43	0.71	0.18	2.27

According to Table 4, although GHG emission issues appear to be gaining importance in recent years, only 51% of the boards of directors of the firms studied had an environment committee, reflecting an increase of 4% from 2013 to 2017 and 15% since 2009 (Berthelot & Robert, 2011). All the firms but two (96.2%) were audited by one of the Big Four audit firms. This is consistent with Berthelot and Roberts' (2011) results, which showed that 90.6% of Canadian firms were audited by one of the Big Four. In 2017, 72% of the firms were closely held and thus had at least one shareholder holding at least 10% of the firm's shares.

Table 4. Descriptive statistics for dichotomous variables (53 firms)

Year	Number of firms	Percentage of firms	Number of firms	Percentage of firms
	Big Four audit firm		*Non-Big Four audit firm*	
• 2013	51	96.2%	2	3.8%
• 2014	51	96.2%	2	3.8%
• 2015	51	96.2%	2	3.8%
• 2016	51	96.2%	2	3.8%
• 2017	51	96.2%	2	3.8%
	Widely held ownership		*Closely held ownership*	
• 2013	27	50.9%	26	49.1%
• 2014	26	49.1%	27	50.9%
• 2015	21	39.6%	32	60.4%
• 2016	22	41.5%	31	58.5%
• 2017	15	28.3%	38	71.7%
	Presence of an environment committee		*Absence of an environment committee*	
• 2013	25	47.2%	28	52.8%
• 2014	25	47.2%	28	52.8%
• 2015	26	49.1%	27	50.9%
• 2016	26	49.1%	27	50.9%
• 2017	27	50.9%	26	49.1%

We now move on to the statistical analysis of the dichotomous variables. Table 5 sets out the results of the non-parametric Mann-Whitney U tests on the mean and tests on the median for the influence of an environment committee on the scope of GHG disclosures. In 2013 and 2014, this variable had a significant impact, indicating that the presence of an environment committee increased the scope of GHG disclosures in the first years of our study, although this influence waned over time.

Table 5. Disclosure scores for the environment committee

Year	Presence of an environment committee	Absence of an environment committee	Mean test	Median test
2013	5.32	3.89	*	
2014	5.60	3.96	*	*
2015	5.19	4.07		
2016	5.23	4.04		
2017	5.26	4.35		

*Note: * significant difference at the 0.05 level.*

Table 6 shows the results of the non-parametric Mann-Whitney U tests on the mean and tests on the median for the influence of the presence of a major shareholder on the scope of GHG disclosures. This variable did not impact the scope of these disclosures during the period under study. Our findings contrast with those of Berthelot and Robert (2011). Being accountable to a widely-held shareholder base no longer explains the scope of GHG disclosures. Shareholder pressures have thus lost their influence on legitimacy management strategies implemented by corporate executives, at least as concerns GHG emission disclosures.

Table 6. Disclosure scores for the ownership

Year	Widely held ownership	Closely held ownership	Mean test	Median test
2013	5.11	4.00		
2014	5.12	4.37		
2015	5.24	4.22		
2016	5.09	4.29		
2017	5.27	4.63		

We intended to examine the influence of a Big Four audit firm on the scope of GHG emission disclosures. However, given the small number of observations relative to non-Big Four firms, no test could be carried out. As a result, we do not know if the auditor's influence changed during the period covered by our study.

To examine the link between financial performance, political exposure, media visibility, and disclosure scope, we made bivariate correlations with the Spearman coefficient for non-parametric tests. The results, set out in Table 7, indicate that political exposure and media visibility are both significant in explaining the scope of Canadian firms' GHG emission disclosures. These findings are in line with those of Liu and Yang (2018) and Janang et al. (2020) and confirm the important role normative pressures play in homogenizing Canadian firms' voluntary disclosure practices. Given the soft legal and regulatory environment surrounding social responsibility disclosures in Canada, it appears that normative pressures from industry associations, similar organizations, non-governmental organizations, and the media have a significant impact on the disclosure practices of Canadian firms.

Table 7. Disclosure scores for the continuous variables

Variable	*2013*	*2014*	*2015*	*2016*	*2017*
Political exposure	0.457**	0.443**	0.388**	0.456**	0.435**
Media visibility	0.336*	0.428**	0.369**	0.479**	0.433**
Financial performance	-0.215	-0.248	-0.128	-0.034	0.056

*Note: ** $p \leq 0.01$; * $p \leq 0.05$ (two-tailed test).*

To further our understanding of the influence of the variables on the extent of the information disclosed, we analysed the influence of the significant variables (political exposure, media visibility, and environment committee) for each dimension of GHG emissions disclosures, as recommended by CPA Canada. Table 8 presents the results of these analyses, showing that both political exposure and media visibility are significant for disclosures on strategies, impacts, and results. However, the variables studied do not significantly influence risk or key performance indicators.

These results reflect an evolution in comparison with the findings of Berthelot and Robert (2011). In 2007, the firms that disclosed the most risk information were more politically exposed and more visible in the media. This difference has diminished. Moreover, during this 10-year period, disclosures on the results of strategies to reduce GHG emissions have substantially increased (+35.3%). It is primarily firms that are the most politically exposed and visible in the media that have contributed to this trend.

Table 8. Additional analysis of the influence of political exposure, media visibility, and environment committee on dimensions of reporting

Year	*Risks*		*Strategies*		*Key performance drivers*		*Impact*		*Results*	
	0	*1*	*0*	*1*	*0*	*1*	*0*	*1*	*0*	*1*
Political exposure										
• 2013	6287.1	10743.9	4358.9	11226.1[1]*	7526.1	14116.4	2335	10813.6[1]*	4222.2	16602.2[1]*
• 2014	7138	11818.6	1708.4	12976.4*	8463.9	13859.6	1413.4	11734.8[1]*	6121.8	14952.5*
• 2015	7390.5	11074.3	4142	11782.1	7944.9	15320.1	1463.2	11339[1]*	5446.8	16685.2[1]*
• 2016	5859.1	11773.3	3493	12483.2	6614.8	19048.3	1453.9	11284.8[1]*	4488	17584*
• 2017	5902.3	12702.6	3540.2	13622.6	8359.2	15081.8	1778.7	11922[1]*	2887.5	20041.8*
Media visibility										
• 2013	5.95	7.03	5.39	7.20	4.29	15.36	1.33	8.12	4.61	9.85*
• 2014	4.35	8.83	0.53	9.39[1]*	5.35	11.62	0.60	8.35	4.84	9.77*
• 2015	4.52	8.60	3.50	8.27*	4.38	16.18	0.10	8.40[1]*	3.88	12.11*
• 2016	1.43	5.91	0.67	5.91*	2.02	11.33[1]*	0.30	5.02[1]*	0.79	9.65*
• 2017	2.81	6.09[1]*	2.00	6.35	4.58	5.46	0.60	5.77[1]*	1.45	9.50*
Environment committee										
• 2013	0.36	0.55	0.44	0.49	0.45	0.55	0.33	0.51	0.39	0.60
• 2014	0.39	0.53	0.33	0.53	0.43	0.62	0.30	0.51	0.39	0.59
• 2015	0.48	0.50	0.38	0.54	0.48	0.55	0.40	0.51	0.44	0.58
• 2016	0.43	0.53	0.44	0.51	0.44	0.67	0.40	0.51	0.42	0.60
• 2017	0.48	0.53	0.47	0.53	0.53	0.46	0.40	0.53	0.45	0.59

*Note: * significant difference at the 0.05 level.*
1 dimensions for which non-parametric Mann-Whitney U tests on the mean are significant but tests on the median are not.

5. DISCUSSION

Our results provide interesting insights into the institutionalisation of GHG emissions reporting practices in a context with soft regulations, as is the case in Canada. We demonstrate that the evolution of GHG emissions disclosures has occurred in stages, with a slow start characterised by contributions from a few pioneering companies, followed by a leap where the vast majority of companies joined the movement, before reaching a plateau. After more than a decade of efforts to encourage Canadian companies to report on their GHG emissions, CPA Canada has been only partially successful, as very few companies take the exercise to its full extent by discussing the integration of GHG emissions in corporate strategy and key performance drivers. Canadian companies can therefore manage their perceived legitimacy by reporting on their GHG emissions the way the majority of Canadian companies do, which is by disclosing general information related to GHG without having to substantively change how they manage their GHG emissions.

Our results also show that the companies that make disclosures on the most indicators are those that are most closely scrutinized by their stakeholders, either because their installations are the most visible or because they are the target of a more intense media focus (Bansal, 2005; Branco & Rodrigues, 2008; Liesen et al., 2015; Rupley et al., 2012). By communicating information on sensitive topics like GHG emissions, these firms strengthen their ties with their stakeholders and manage these stakeholders' perceptions of the legitimacy and impact of their activities. It thus appears that in applying an instrumental approach, corporate executives can use GHG emissions disclosures to alter the perceptions of their stakeholders, without whose support their organization would cease to exist (Clarkson, 1995; Mullenbach-Servayre, 2007). Overall, our findings support the need for securities regulators to take a more directive approach to GHG emissions reporting.

6. CONCLUSION

The aim of this study is to trace the evolution of firms' voluntary GHG emissions disclosures and to evaluate to what extent this evolution is influenced by their political exposure and media visibility, their audit firm, the presence of an environment committee, their ownership structure, and their financial performance. Our results show that even though Canadian firms in the oil and gas, chemical, and mining sectors voluntarily provide information about climate changes, there is still room for them to significantly improve the scope of their disclosures to comply with CPA Canada guidelines on voluntary GHG emissions disclosures.

Our results confirm firms' efforts to better inform their stakeholders of the risks and opportunities inherent in climate change. When we compare our findings to those of Berthelot and Robert (2011), it is clear that Canadian firms have made considerable progress in terms of the level of information provided in their voluntary disclosures. All the firms studied in 2017 disclose information on the risks relating to GHG regulation, in contrast to only 42.2% that did so in 2007. Similar progress was noted in firms' disclosures of their strategies to manage GHG emissions; close to four firms in five made no such disclosures in 2009, compared to one in three in 2017. Key performance drivers remain largely ignored in voluntary disclosures, being mentioned by only one firm in four in 2017 (none in 2009). However, the impact and results of GHG emissions management are now disclosed in more depth; in 2017, close to four firms in five mentioned their impact, and one in two mentioned their results, compared to one in five and eight in a hundred respectively in 2009.

Political exposure and media visibility are the factors found to have the greatest influence on the scope of the information disclosed. The influence of variables respecting the presence of an environment committee and a shareholder holding over 10% of the firm's shares on firms' disclosure decisions was shown to be less significant. In contrast to Russo and Fouts (1997), our study found that strong financial performance does not increase the level of GHG emissions disclosures in annual reports. A final contribution of this study relates to firms that make disclosures about the results of implementing GHG emissions management strategies. These firms are strongly influenced by political pressure and media visibility, which suggests that normative pressures tied to political exposure and media visibility play a major role in the adoption of voluntary GHG disclosure measures. The most exposed and most visible firms are subject to stronger pressure to be accountable, pressure to which they yield in order to manage their legitimacy and thus becoming examples for their peers.

These findings confirm the important role played by normative pressures in a voluntary disclosure context, urging firms to align their practices with other firms in their organizational field in a quest for legitimacy. Political exposure and media visibility influence industry practices and promote isomorphism, which in turn secures the legitimacy of the firms that comply with best practices. In making voluntary disclosures, firms influence their stakeholders' perceptions of their organization and ensure society's support (Janang et al., 2020).

A number of studies have addressed the factors that influence the level of voluntary environmental disclosures made in annual reports for a specific year. However, only a few have examined how this situation has evolved over time. It is thus interesting to note that some factors that had previously been determined to have had a significant impact on the quality of environmental disclosures are of little importance today. This study shows that voluntary disclosures seem to have plateaued. In other words, although the number of disclosures appears to have increased over time, the level of voluntary disclosures has tended to stagnate over the last few years.

This study has some limitations. For example, like the study by Berthelot and Robert (2011), it is limited to Canadian companies in the chemicals, energy, and mining sectors. It would therefore be interesting to extend it to other industries or countries. As well, the sample includes only listed firms.

This study suggests various avenues for future research. For example, it would be interesting to examine in more detail the wording used by firms in high GHG emissions sectors in light of the legitimization tactics identified in prior research (Deegan, 2007). Our findings appear to show that firms make more disclosures where they portray themselves as "victims" of regulation. It could also be worthwhile to examine the impact of the audit of GHG data contained in various sustainable development reports on the voluntary disclosure of these emissions included in annual reports. Do these audits help improve disclosures?

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APPENDIX

Table A.1. Sample composition

No.	***Company***
1	Advantage Oil & Gas Ltd.
2	Agnico Eagle Mines Ltd.
3	Agrium
4	ARC Resources
5	Barrick Gold Corp.
6	Baytex Energy Corp.
7	Bengal Energy Ltd.
8	Birchcliff Energy Ltd.
9	Bonavista Energy Corporation
10	Bonterra Energy Corp.
11	Cameco
12	Canadian Natural Resources
13	Cenovus Energy Inc.
14	Centerra Gold
15	Chemtrade Logistics Income Fund
16	Corridor Resources Inc.
17	Delphi Energy Corp.
18	Dundee Precious Metals Inc.
19	Eldorado Gold
20	Encana Corp.
21	Energold Drilling Corp.
22	First Majestic Silver Corp.
23	First Quantum Minerals
24	Freehold Royalties Ltd.
25	Gran Tierra Energy Inc.
26	Granite Oil Corp.
27	Husky Energy Inc.
28	Iamgold Corp.
29	Imperial Oil Ltd.
30	Labrador Iron Ore Royalty Corporation
31	Methanex Corporation
32	Nevsun Resources
33	Niko Resources Ltd.
34	Nuvista Energy Ltd.
35	Obsidian Energy
36	Paramount Resources Ltd.
37	Parex Resources Inc.
38	Pengrowth Energy Corporation
39	Perpetual Energy Inc.
40	Peyto Exploration & Development Corp.
41	Return Energy Inc.
42	SEMAFO
43	Sherritt International Corp.
44	Storm Resources Ltd.
45	Suncor Energy Inc.
46	Sunshine Oilsands Ltd.
47	Teck Resources
48	Transglobe Energy Corp.
49	Typhoon Exploration Inc.
50	Uranium One
51	Vermilion Energy Inc.
52	Whitecap Resources Inc.
53	Yamana Gold Inc.