

INSTITUTIONAL PRESSURES ON DISCLOSURE OF CARBON CONTROL ISSUES BY OIL AND GAS COMPANIES

*PRESSÕES INSTITUCIONAIS NA EVIDENCIAÇÃO DOS CONTROLES
DAS EMISSÕES DE CARBONO DAS EMPRESAS DE ÓLEO E GÁS*

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ABSTRACT

This paper evaluates the influence of institutional pressure on climate change project disclosure in oil and gas companies. It was based on a sample of sustainability reports issued by 35 companies included on the 2011 Fortune ranking from the USA, Europe, Latin America and Asia. Empirical results suggest that companies positioned at the top of the Fortune ranking have higher levels of information disclosure on climate change projects. These companies are the most susceptible to normative pressure, contradicting the claim that climate strategy is predominantly associated with the mimetic or coercive pillar. Companies in emerging economies have low levels of disclosure because environmental issues receive less attention than social issues, such as poverty. The study demonstrated that multinationals were subject to low coercive pressures due to the lack of clear regulations and international enforcement mechanisms. The oil and natural gas companies surveyed are exposed to institutional pressure associated with the three types of isomorphism and see disclosure of climate change projects as a way of acquiring legitimacy.

Keywords: climate change, institutional theory, environmental disclosure, oil and gas companies.

RESUMO

O artigo avalia a influência das pressões institucionais na evidenciação de projetos de mudança climática em empresas de petróleo e gás. O trabalho baseia-se em uma amostragem de 35 relatórios empíricos de sustentabilidade de empresas americanas, europeias, asiáticas, publicados em 2011 na Fortune. Resultados sugerem que as companhias posicionadas no topo do *ranking* da Fortune têm maiores níveis de evidenciação de projetos de mudança climática. Essas empresas são mais suscetíveis às pressões normativas, contrariando a ideia de que a estratégia climática esteja associada às pressões miméticas ou coercitivas. Empresas em economias emergentes possuem baixos níveis de evidenciação, em virtude das questões ambientais receberem um menor nível de atenção, quando comparadas às questões sociais, como a pobreza. O estudo demonstra que as multinacionais estão sujeitas a baixas pressões coercitivas, em virtude da ausência de regulações claras e mecanismos internacionais de fiscalização. As empresas de petróleo e gás estão expostas

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às pressões institucionais associadas com os três tipos de isomorfismo (coercitivo, mimético e normativo), com a predominância do pilar normativo, e podem, através do desenvolvimento de projetos de mudança climática, adquirir legitimidade frente aos *stakeholders*.

Palavras-chave: mudança climática, teoria institucional, evidência ambiental, empresas de petróleo e gás.

INTRODUCTION

Individual investors and investment funds are demanding greater disclosure of environmental and social issues in addition to the financial information disclosed in mandatory annual reports (Epstein and Freedman, 1994). Studies have focused on disclosure of human resources management, environmental management and community involvement (Milne and Chan, 1999). Escobar and Vredenburg (2011) pointed out that stakeholders have affected the disclosure of each sector differently. For example, much pressure was laid on the automobile industry to improve passenger safety and, more recently, to reduce greenhouse gas (GHG) emissions. In the clothing industry, pressure has been concentrated on human rights issues (e.g. child labor) and the demand among consumer groups for environment-friendly products (e.g. organic cotton).

In the case of oil and gas industry, most studies have focused on the response of companies to stakeholder demands, with emphasis on carbon disclosure and climate change project (Lee, 2012). Mekaroonreung and Johnson (2010) consider oil refineries a major source of stationary pollution, grouping them with chemical industries, coal-fired plants, metal mining companies and heavy industry. Oil refineries make a substantial contribution to GHG emissions. They constitute the second-largest source of industrial sulphur dioxide emissions, the third-largest source of nitrogen oxide emissions and the greatest stationary source of volatile organic compounds (Saha and Gamkhar, 2005). In view of the growing concern with climate change, oil refineries will likely continue to be subject to stricter regulations regarding CO₂ emissions.

Institutional theory can be useful to explain the reasons why companies release information on emissions and related impact on social and environmental issue. Rahaman *et al.* (2004) used institutional theory to explain the adoption of practices of environmental disclosure by a state-owned company. Aerts *et al.* (2006) employed the same theory to interpret mimetic behaviors due to organizational pressure on companies from different countries and sectors.

Differences between countries are not limited to aspects related to their performance indicators. Their institutional environment differentiate them by presenting, for example, distinct features in their political, financial, educational and cultural systems. It is expected that the structures that govern the

actions of enterprises, strategic priorities and organizational capabilities are different as are most distinguished institutions across countries (Whitley, 2003).

The institutional perspective emerges as an alternative way for the analysis of the organization, in opposition to the rationalist conception of action, and therefore should be designed by rational criteria of choice, aimed at achieving defined goals (Orij, 2010). In this perspective the rationalization of the organization is limited by the internal pressure groups, the search for stability and legitimacy, and its structure reflects the reference context and the symbolic and regulatory frameworks in which it operates.

DiMaggio and Powell (1983) pointed out that companies will adopt certain behaviors to gain access to resources and support strategic stakeholders. According to the institutional perspective, organizations operate in a framework of social norms, values and beliefs about what is considered an acceptable and appropriate economic behavior (Grecco *et al.*, 2013). Aguilera and Jackson (2003) argue that transnational diversity of corporate governance can be explained in terms of the institutional setting that shapes how each stakeholder group is related to decision-making and control over corporate resources.

Escobar and Vredenburg (2011) claimed that oil and gas companies are among the industries most subject to institutional forces (coercive, normative, cultural/cognitive). The authors compared four large multinational oil companies subject to similar forces and found that their potential impact on climate change was the main reason for them to develop mitigating strategies and actions. Hoffman (2006) pointed out earlier that stakeholders influence actions of government as well as corporations to control negative effects. Such actions can have an impact on competitiveness through restrictions on GHG emissions, which can increase energy prices.

Having established the diversity of company responses to institutional pressure, this paper addresses the question: *What is the effect institutional environment have on climate change projects of oil and gas companies?* Thus, we intend to: (a) code categories related to inventory of emissions, climate strategy and carbon disclosure; (b) identify group of companies with similar institutional forces; (c) examine the influence of the types of isomorphisms on the disclosure of climate change projects.

Disclosure reports are examined from companies operating in different parts of the world and having different corporate strategies. We seek to make three contributions. First, we probe how forces operating at the macro and micro level outside the firm affect the adoption of climate change projects. Second, by situating the study in a global perspective, including companies from the USA, Europe, Asia and Latin America, we contribute to the limited body of knowledge about climate change strategy in the light of the particular institutional, political and social perspective. Finally, our research also shed light that normative pressures have a greater influence on oil and gas companies than coercive and cultural/cognitive forces.

To achieve the objective the next section of this paper uses institutional theory to explain different corporate climate change strategies. Then, the paper describes the characteristics of the sample, data collection process and the analyses based on the reports of 35 oil and natural gas companies. The results are presented for each company and grouped by country and information category. Finally, we draw conclusions about the extent of institutional pressures on the disclosure of information on climate change projects.

THE INFLUENCE OF INSTITUTIONAL PRESSURE ON CORPORATE DISCLOSURE OF CLIMATE CHANGE PROJECTS

In 1988, the US Securities and Exchange Commission established the first requirements for environmental disclosure by companies (Regulation S-K). These requirements were subsequently strengthened by the environmental protection agency to require annual mandatory reports and increased transparency with regard to potential environmental impacts (Fleischman and Schuele, 2006).

Boiral (2013) argued that voluntary as opposite to mandatory disclosure is more efficient in informing stakeholders about an organization's sustainability performance. It distinguishes high corporate environmental performance, reduces risks, increases the corporate reputation and sheds light on hard-to-imitate sustainability strategies. Clarkson *et al.* (2008) pointed out that there is a positive relationship between environmental performance and the level of discretionary disclosures in sustainability reports. Regardless of whether reports are mandatory or voluntary, the most important factor is the quality of information. It should be up-to-date, reliable and useful to stakeholders (Crawford and Williams, 2010).

Lee and Hutchison (2005) pointed out that there are three categories of factors (societal, organizational and individual) that can influence environmental information disclosure. Societal factors are related to laws and regulations which define the legitimacy of corporate actions. Organizational factors are related to ownership status, size, industry affiliation and risk. These variables can be used to exam cost/benefit analysis of alternative levels of disclosure.

Individual factors are related to culture and attitudes which could impact decisions toward disclosure.

Matten and Moon (2008) compared the institutional environments of Europe and the USA. They found that coercive, normative, and cultural/cognitive processes lead to standardized practices among companies. In this way, the institutional framework provides a theoretical perspective that is helpful in understanding organizational strategy and the types of pressure mechanisms are predominant. DiMaggio and Powell (1983) argued that institutional theory sheds light on how corporate practices acquire legitimacy and become social values. Firms seek legitimacy by adopting and reproducing the common practices of their sector.

Scott (1995) established the "three pillars" in institutional theory, which are called the regulatory, normative, and cultural/cognitive pillars. The "regulatory (or legal) pillar" consists of rules, laws and sanctions that guide organizational action. Each country operates within its boundaries to regulate society and business activity by ways of coercive action. In this sphere, rules and laws are established to prevent conflicts or resolve differences. Regulatory processes are usually implemented through formalized mechanisms employing agents such as inspectors and legal agents (Scott, 2008).

DiMaggio and Powell (1983) pointed out that coercive isomorphism is tied to legal influence and the quest for legitimacy. Carruthers (1995) support this view by affirming that this type of isomorphism is the result of expectations and pressure of firms that operate on the same industry. The adoption of new pollution control technologies for the sole purpose of satisfying environmental regulations is a good example of isomorphism.

The "normative pillar" is characterized by rules that introduce a prescriptive, evaluative and obligatory dimension into social life. According to Scott (2008), normative systems include both values and norms together with the construction of standards to which existing structures or behaviors can be compared or assessed. Normative systems not only define goals and objectives but also indicate appropriate ways to pursue them (e.g. by establishing game rules or fair commercial practices).

The "normative pillar" reflects moral principles based on norms of society. The emphasis is on morally appropriate attitudes, which become standards of organizational legitimacy (Scott, 1995). DiMaggio and Powell (1983) pointed out that normative isomorphism derives from professionalization and involves a set of work-related norms and procedures. Thus, acceptance of social and professional norms may be interpreted as compliance to a business model.

Finally, the "cultural-cognitive pillar" is based on a socially constructed concept of beliefs and behaviors. This concept involves what social actors accept as reality (Scott, 2008). Organizational legitimacy comes essentially with adherence to what is conceptually and culturally appropriate, or taken for granted. Thus, emphasis is shifted from the normative

and regulative elements of conventional institutionalism to a construct based primarily on beliefs and morality (Guarido Filho and Costa, 2012).

DiMaggio and Powell (1983) demonstrated that mimetic isomorphism is the result of standardized responses to environmental uncertainties. Carruthers (1995) provided several examples of how companies copy the structures and procedures of other organizations which have been successful in dealing with environmental uncertainties. Escobar and Vredenburg (2011) believe that, regardless of the technical or social nature of the norms, the inefficiency of regulatory agencies in developing countries limits the enforcement.

Social, economic, and environmental demands differ according to country, society and even community. Societies in developing economies tend to have an anthropocentric view of development, while societies in more advanced economies favor a more "sustainable" approach (DiMaggio and Powell, 1983). Thus, in developing countries, climate change may not be given as much attention as the fight against poverty.

Developing countries with high economic growth rates, such as China, find it hard to reduce CO₂ emissions (Escobar and Vredenburg, 2011). In less developed countries, social and environmental issues are often neglected and emphasis is laid on technical problems (e.g. GHG limits, waste disposal and necessary technology), decelerating the pace of regulatory change.

Making a GHG emission inventory may be an organization's first step towards a climate change strategy. Based on this inventory, an emission profile may be drawn with which the organization can move on to develop strategies, plans and goals

for GHG reduction and management, thereby participating in the great challenge of global sustainability. Through initiatives such as the Carbon Disclosure Project (CDP) and information provided by the Institutional Investors Group on Climate Change (IIGCC), investors are encouraging firms to make increasingly detailed information available regarding their GHG levels, management systems and risks and opportunities associated with climate change (Sullivan and Gouldson, 2012).

Burritt and Schaltegger (2010) believe that environmental management ideally involves environmental costing, life cycle and value chain analysis, and offered a set of pragmatic tools to help managers deal with social and environmental issues. Deegan (2007) pointed out that sustainability reports provide stakeholders with information on how the organization is dealing with sustainability issues and to what extent it is meeting stakeholders' demands.

The impact of climate change depends on the vulnerability of the system exposed to it. A different set of social, economic, political, cultural, environmental and geographical factors may be involved in each case. Therefore, according to Brooks and Adger (2005), successful adaptation to climate change requires accurate information about the nature and evolution of the climate risks to which a given society and economic system is exposed.

METHODOLOGY

This study is qualitative, which is particularly suited to understanding the dynamics operating in single settings

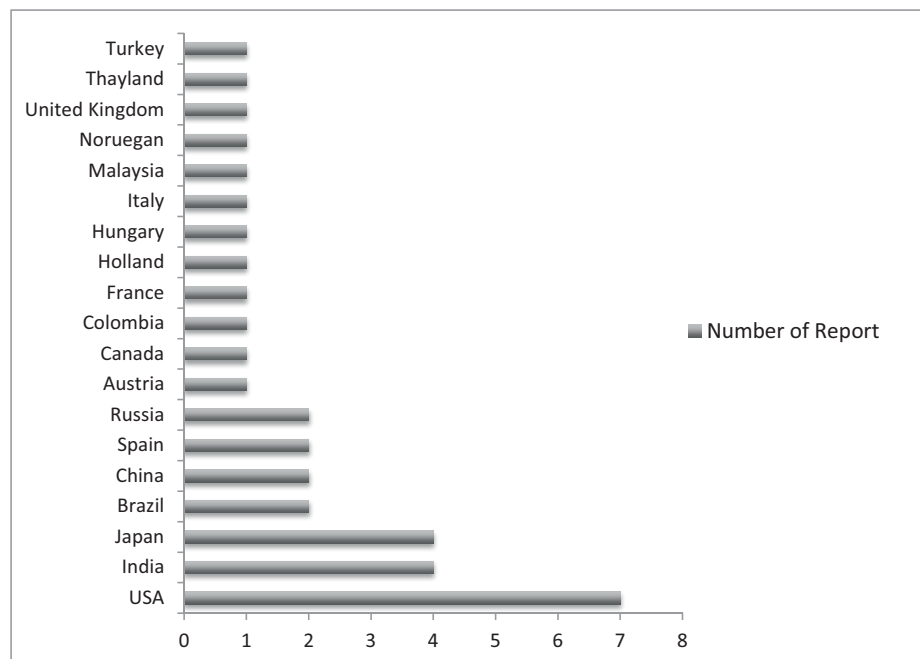


Figure 1. Number of reports by countries.

Source: From survey.

(Eisenhardt, 1989). The research design follows a multiple-face perspective analysis because we want to understand how the institutional environment influence climate change projects from oil and gas companies. It is based on content analysis of sustainability reports of oil and natural gas companies published in 2012. The sample included 35 sustainability reports issued by oil and gas companies placed at the top of the Fortune Global 500 ranking. Figure 1 presents the total reports from each country and its percentage. Particularly, reports were disclosure by companies from EUA (20%), Japan (11%), India (11%), Brazil (6%), China (6%), Spain (6%) and Russia (6%), in that order.

Information was organized into the categories and subcategories of analysis based on Pinkse and Kolk (2009)

which provided a list of indicators related to GHG control, the disclosure of which is strongly recommended. For the purpose of this study, the list was expanded with indicators related to climate change projects and GHG control which firms are encouraged to publish in detailed sustainability reports.

Table 1 gives insight into the various aspects (and choices) that play a role in carbon control, and decisions that companies may have to take in the design and implementation of systems. These groups and subgroups of information shown make up the 3 categories and the 19 subcategories of analysis of the sustainability reports of the sampled firms. The preliminary content analysis allowed to identify key words and their synonyms pertaining to the three categories (GHG inventory, climate strategy and carbon disclosure) and to register

Table 1. *Issues related to corporate carbon control.*

Issues	Possible Considerations at the Sustainability Report
(1) <i>Emission inventory</i>	Actual climate impact
	Stakeholder pressure and perceptions
	Company strategy (including amount invested)
	Management priorities and values
	Specific purpose for having an inventory (whether for emissions trading scheme and/or climate change register and/or internal purpose in terms of better management of GHG emissions)
	Only company itself or also (parts of) supply chain
	Only 100% ownership or also partly owned subsidiaries and/or joint ventures (in case of the latter selection to be made between equity share and control approach)
	Which GHG source to include:
	* Direct: Scope 1 (owned/controlled by company)
	* Indirect: Scope 2 (generation or purchased electricity)
* Indirect: Scope 3 (other sources not owned or controlled)	
(2) <i>Climate strategy</i>	In the process, accurate consideration of accounting principles relate to relevance, completeness, consistency, transparency and accuracy
	Leadership and reputation issues
	Possibility of cost saving due to efficiency focus
	Assessment of whether targets are a <i>sine qua non</i> condition for reduction programs and measures or not
	Target coverage: energy use and/or GHG emissions
(3) <i>Carbon disclosure</i>	Organizational scope: direct and/or indirect
	Overall degree of stringency aimed for, considering historical achievements, growth paths, and future plans of the company in industry and (inter)national contexts
	Duration (target year)
	Engage in carbon reporting or not
	How to ensure harmonization between various means of disclosure
	Which aspects to include, reckoning with internal, operational and strategic as well as external implications.

Source: Pinkse and Kolk (2009, p. 65).

similarities between the key words of the subcategories and the information retrieved from the reports.

The identification of the institutional pressures on disclosure of carbon control issues by Oil and Gas Companies was conducted following the content analysis steps proposed by Creswell (2010). Data were organized and collected from the reports, followed by a coding process which define the categories of analysis, and finally, the interpretation and extraction of meaning. Content analysis was aimed at validating the theoretical framework proposed by Pinkse and Kolk (2009). The NVIVO® 10 software package was used to permit systematic and objective description of the texts through indicators. This procedure allows inferences of the message as captured from reports. Each expression that could be represented by a word, a phrase or paragraph was transformed into a node (Saldaña, 2009).

The study used the double hermeneutic coined by Giddens (2013) to interpret how firms understood social meanings of climate change projects. All the sources were coded twice to improve their meanings. The codes were merged together and split where possible to get more meaning about the phenomenon (Corbin and Strauss, 2014). Following Catellani (2011), the analysis examined how directions and strategies were described and how different narratives were structured.

Based on the approach of Creswell (2007), single instances of similarities or differences were used to interpret the data without looking for multiple instances. This is a process for pulling the data apart and putting them back together in a more meaningful ways. An attempt was then made to establish patterns, looking for correspondence between climate change projects and institutional environment. The presentation of the results starts with a general view of the companies participating in the study followed by the results of the frequency of key word use, and a hierarchic cluster diagram was build.

RESULTS

Similarities between the key words in the subcategories and in the sustainability reports were identified and their frequency of use was determined. Table 2 ranks the companies in the sample by decreasing order of frequency with which the keywords and their synonyms occur in the reports. Results were presented by the three category of analysis (GHG inventory, climate strategy and carbon disclosure). The highest overall level of disclosure was Royal Dutch Shell (Netherlands), followed by Chevron (US), Exxon (US), Hess (US), Repsol (Spain) and Statoil (Norway). This rank was established by frequency of keyword usage as a proxy for the level of climate change project disclosure.

The first category (GHG inventory) includes keywords related to impacts on the current climate, stakeholder pressure, company strategies, management values, purpose of GHG inventory, supply chain, subsidiaries, sources of GHG, and GHG

measuring procedures. For example, the Royal Dutch Shell report addresses the environmental and social challenges which most affect business performance and are of greatest concern to the main stakeholders. Related to business strategies, this report describes the implementation and maintenance of a CO₂ management program supervised by a corporate entity called "Group CO₂". The purpose of the "Group" is to provide a direct line of accountability with the CEO, thereby influencing company strategies and business decisions.

The Royal Dutch Shell report states that the GHG inventory is an essential tool in the company's climate change strategy, which involves: (i) increased natural gas production, (ii) development of carbon capture and storage technologies, (iii) low-carbon biofuels production, and (iv) adoption of energy-efficient procedures. In addition, the report describes internal controls, such as audits and statistical tests used to ensure the accuracy of the information disclosed. An external review committee of independent experts provides information relevant to each group of stakeholders.

The second category (climate strategies) includes key words related to leadership and reputation, cost reductions, and the nature, scope and duration of the company's CO₂ targets. For example, the Chevron report states that the company focuses on CO₂ reduction technologies. These include advanced biofuels, solar energy technology and energy efficiency. These projects boost the company's reputation and present it as a responsible carbon manager to customers, suppliers, partners and others stakeholders.

Chevron's report disclosed the company's preliminary and total GHG target for 2012 (60,5 million tons of CO₂). GHG emissions are expected to be reduced through energy efficiency projects and reductions in flaring and venting at production sites. Chevron was one of the few companies providing information on organizational scope (direct and/or indirect) in the pursuit of company targets. On the other hand, Petronas made no such disclosure in its report.

The third category (carbon disclosure) includes key words related to decisions concerning external reporting. Most companies reported being involved in some kind of climate change project. For example, BP reported participating in the Carbon Disclosure Project (CDP) and supporting research in technology and innovation. The company focuses on increasing production efficiency and developing and implementing new low-carbon technologies in response to environmental regulations.

On the other hand, the four lowest positions on the ranking (Table 2), i.e. the companies with the lowest overall level of disclosure based on the number of keywords in each subcategory, were Bharat Petroleum (India), Ultrapar (Brazil), Petronas (Malaysia) and Valero (US). For instance, the report issued by Valero contained information covering only three subcategories: company strategy, management values, and GHG measuring principles. Furthermore, the disclosed information was poorly detailed. The remaining companies in the sample

Table 2. Frequency of climate change key word usage in reports issued in 2012 by 35 top oil and natural gas companies organized by category.

Company	Country	Climate change project keyword frequency			Total	%
		GHG inventory	Climate strategy	Carbon disclosure		
Royal Dutch Shell	Holland	12	4	1	17	5.0%
Chevron	USA	9	5	1	15	4.5%
Exxon	USA	9	5	1	15	4.5%
Hess	USA	9	5	1	15	4.5%
Repsol	Spain	9	4	1	14	4.2%
Statoil	Norway	8	5	1	14	4.2%
ENI	Italy	7	5	1	13	3.9%
Suncor	Canada	7	5	1	13	3.9%
BP	United Kingdom	9	2	1	12	3.6%
Conoco Phillips	USA	7	5	0	12	3.6%
Ecopetrol	Colombia	8	3	1	12	3.6%
Indian Oil	India	6	5	1	12	3.6%
Marathon Oil	USA	6	5	1	12	3.6%
OMV Group	Austria	7	4	1	12	3.6%
Gazprom	Russia	7	3	1	11	3.3%
Rosneft	Russia	7	3	1	11	3.3%
Petrobras	Brazil	5	4	1	10	3.0%
JX Holdings	Japan	5	3	1	9	2.7%
Oil & Natural Gas	India	6	2	1	9	2.7%
PTT	Thailand	6	2	1	9	2.7%
Cosmo Oil	Japan	4	3	1	8	2.4%
Occidental Petroleum	USA	6	1	1	8	2.4%
CNPC	China	5	1	1	7	2.1%
Idemitsu Kosan	Japan	4	2	1	7	2.1%
Sinopec	China	5	1	1	7	2.1%
Cepsa	Spain	6	0	0	6	1.8%
Koç Holding	Turkey	4	1	1	6	1.8%
Mol Oil & Gas	Hungary	4	1	1	6	1.8%
Reliance Industries	India	4	1	1	6	1.8%
Showa Shell Sekiyu	Japan	4	1	1	6	1.8%
Total	France	4	1	1	6	1.8%
Bharat Petroleum	India	4	0	1	5	1.5%
Ultrapar Holdings	Brazil	4	0	1	5	1.5%
Petronas	Malaysia	3	0	1	4	1.2%
Valero	USA	3	0	0	3	0.9%
Total frequency		213	92	32	337	100%

Source: From survey using NVIVO® 10 software.

displayed a reasonable overall level of disclosure. For example, the information disclosed by Petrobras was not very detailed, but the report was more complete than that of Ultrapar.

The cluster analysis helps shed light on the company distribution by identifying dendrogram clusters in a hierarchical tree and determining the distance between them. The dendrogram lists all samples and indicates at what level of similarity any two clusters were joined. The position of the line on the scale indicates the distance at which the clusters were joined. The dendrogram is also a useful tool for determining the cluster number. Note any sudden increase in the difference between adjacent steps, as it will indicate an appropriate number of clusters to consider.

To proceed with the cluster analysis, NVivo built a dendrogram using the study parameters derived from the categories of Pinkse and Kolk (2009) (Table 2). The cluster analysis was based on the Pearson coefficient, which measures the strength and direction of the correlation. The scale assumes values between 1 and -1. A value above .70 indicates a strong correlation, from .30 to .70, a moderate correlation, and from 0 to .30, a weak correlation. Royal Dutch Shell (Netherlands) and Exxon (US), the two top oil and natural gas companies on the Fortune ranking, displayed the strongest correlation. When

compared pair-wise, Royal Dutch Shell, Exxon and Chevron displayed the strongest correlation in relation to the other companies in the sample.

Figure 2 shows a hierarchical tree with two main clusters indicated by the intercepting vertical line "A". If compared to Table 3, it may be seen that cluster #1 includes most of the companies with the most frequent use of climate change-related key words in their reports (i.e. the most complete reports). Conversely, cluster #2 contains most of the companies with the least frequent use of climate change-related key words. The two clusters are based on the similarity of the correlation coefficients.

The dendrogram, shown in Figure 2, reveals that 14 (70%) of the 20 top oil and natural gas companies on the Fortune ranking belong to the same cluster (#1). Most of the organizations with high levels of disclosure in their reports are at or near the top of the Fortune ranking. In terms of financial performance, the total gross revenue of the 35 companies in our sample was USD 3,605,610 million in 2011, of which 67% fell within cluster #1. It should be noted that the three largest companies in this cluster (i.e. Royal Dutch Shell, Exxon and BP), which also happen to be at the top of the Fortune ranking, were responsible for a total gross revenue of USD 1,041,754 million in 2011 (29% of our sample).

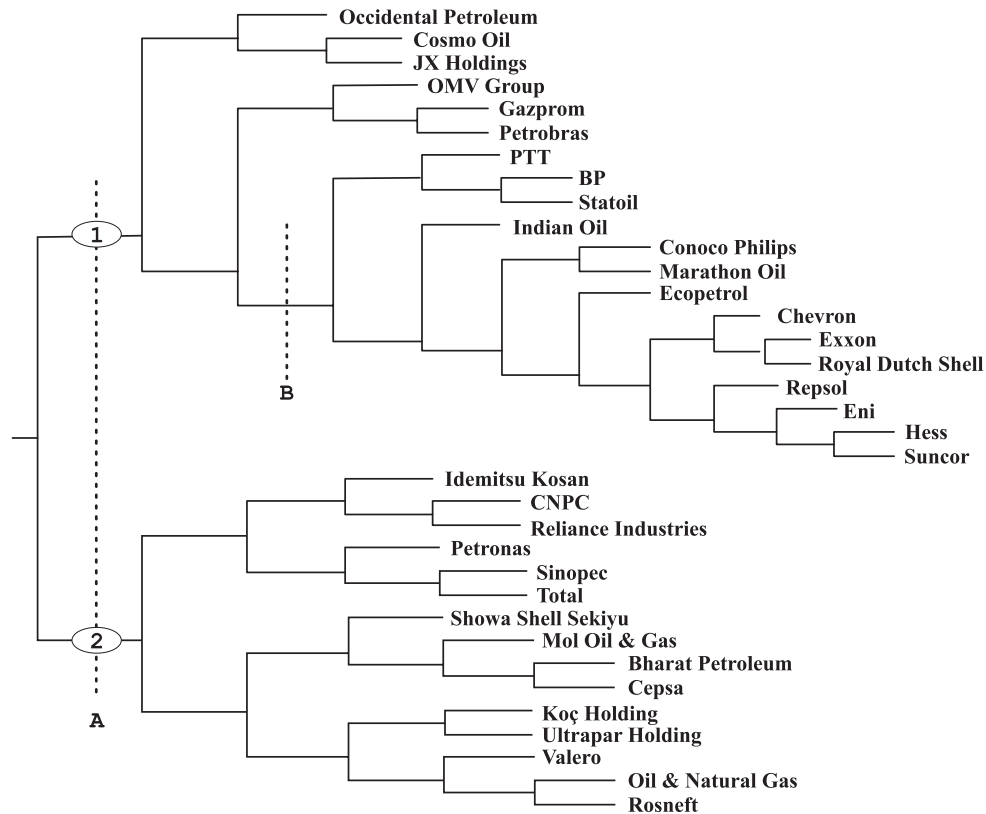


Figure 2. Oil and gas company dendrogram based on the use of climate change-related keywords in sustainability reports (all categories).

Source: From survey using NVIVO® 10 software.

The intercepting vertical line "B", as shown in Figure 2, indicates a secondary cluster. This cluster contains the 14 companies with the most frequent number of climate change-related keywords in their reports (Table 2). The total gross revenue of the companies in this cluster was USD 2,000,702 million in 2011 (55% of the sample). The three companies with the strongest correlation (i.e. Royal Dutch Shell, Exxon and Chevron) belong to the same cluster; i.e. they are very similar with regard to the categories of analysis.

At the top of the Fortune ranking, Exxon and Chevron (US) issued the most complete sustainability reports. On the other hand, the report published by Valero (US) provided insufficient information related to the categories of climate change projects. The financial performance among these companies also differed substantially. In 2011, Exxon and Chevron had annual gross revenues in the order of USD 354,674 million and USD 196,337 million, respectively, while Valero reported only USD 86,034 million.

These three companies are American multinationals and have operations in the US. It would seem that climate change project disclosure cannot be interpreted based on the regulative pillar alone. According to Scott (1995), in the coercive sphere rules and laws are established under the pretext of preventing conflicts or solving differences, and non-complying agents are subject to sanctions. It seems that the influence of normative pillar can be predominant among coercive and mimetic pillars.

Multinationals surveyed are becoming increasingly conscious of their social role related to the community and the environment, establishing a new concept of business ethics. Oil and gas companies try to persuade stakeholders they are engaged in responsible actions, addressing social issues, but they also attempt to influence government regulations in order not to compromise their competitiveness. Thus, in the process of increasing transparency, oil and gas companies are likely to experience stronger normative pressures.

Despite the position on the Fortune ranking, the Chinese companies Sinopec and CNPC performed poorly in terms of disclosure of climate change projects. The Brazilian companies Petrobras (among the best-placed on the Fortune ranking) and Ultrapar displayed similar behavior, with only moderate levels of social and environmental disclosure.

These companies give greater priority to social issues, such as the alleviation of poverty, than to climate change projects. Jenkins (2001) argued that environmental regulation has been a key factor driving Brazilian firms to improve their environmental performance. Their main operational controls involve water consumption, wastewater disposal and energy use, which are significant production cost items.

According to its report, Chevron monitors scientific publications and participates in sector-specific groups, such as the International Petroleum Industry Environmental Conservation Association (IPIECA), in order to remain up-to-date in climate science and political discussions. The company also

cooperates with international governmental agencies and other stakeholders to define the best practices of GHG management, monitoring and reporting. These practices represent a form of normative isomorphism. Society also expects large corporations to undertake climate change projects in response to the extraction of raw materials.

The content analysis revealed 124 isomorphic environmental actions (Table 3), suggesting that companies adopt such disclosure practices to acquire legitimacy. Of these, 76 were normative, 31 were coercive and 17 were mimetic. Companies of the sample were mainly influenced by normative isomorphism.

Among the companies in our sample, Chevron seems to be one of the most strongly influenced by normative isomorphism due to stakeholder pressure. On the other hand, BP was the company most strongly influenced by coercive isomorphism due to efforts to avoid further penalties for non-compliance with environmental legislation. BP appears to have learned a lot from the oil spill in the Gulf of Mexico in 2010.

There is much uncertainty about what information should be included in the report or which practices are expected by stakeholders. BP and other companies appear to focus on actions associated with standards established by society rather than adopting the social and environmental disclosure standards established by oil and gas industry associations. Mimetic isomorphism was identified in the sustainability report issued by Ecopetrol, which describes standardized GHG inventory and energy use indicators. The company uses these indicators to compare its performance to that of other oil and energy companies and thereby improve its strategies.

The companies surveyed were seemingly less influenced by coercive than by normative isomorphism due to lack of clear regulations and enforcement mechanisms at the international level. Isomorphism is predominantly normative based on the number of companies adopting the same business model through standards established by oil and gas companies and industry associations.

DISCUSSION

This study evaluated the influence of the institutional environment on the disclosure of climate change projects in sustainability reports by a sample of oil and gas companies included on the 2011 *Fortune* ranking. In essence, our findings indicate that the dynamic blend of global and local institutional forces and the behavior of the various actors in societal governance influence the disclosure of carbon control issues. In fact, Beuren *et al.* (2011) stated that voluntary disclosure of social and environmental information through company reports may be motivated by the desire to obtain, or maintain, organizational legitimacy.

Our results confirm that the behavior of the sampled US companies was both proactive and reactive with regard to

Table 3. Content analysis of type of isomorphism.

Company	Country	Isomorphism keywords Frequency			Total
		Normative	Coercive	Mimetic	
BP	United Kingdom	2	6	4	12
Chevron	USA	6	2	2	10
Repsol	Spain	4	3	2	9
Royal Dutch Shell	Holland	4	3	0	7
Suncor	Canada	3	3	1	7
Hess	USA	3	1	2	6
Gazprom	Russia	2	3	0	5
Statoil	Norway	2	2	1	5
Exxon	USA	4	0	0	4
Idemitsu Kosan	Japan	4	0	0	4
Cepsa	Spain	3	0	1	4
CNPC	China	3	1	0	4
Ecopetrol	Colombia	3	0	1	4
Petrobras	Brazil	2	2	0	4
Conoco Phillips	USA	1	3	0	4
Oil & Natural Gas	India	2	1	0	3
OMV Group	Austria	1	1	1	3
Bharat Petroleum	India	1	0	2	3
Cosmo Oil	Japan	2	0	0	2
ENI	Italy	2	0	0	2
JX Holdings	Japan	2	0	0	2
Marathon Oil	USA	2	0	0	2
Mol Oil & Gas	Hungary	2	0	0	2
PTT	Thailand	2	0	0	2
Rosneft	Russia	2	0	0	2
Showa Shell Sekiyu	Japan	2	0	0	2
Ultrapar Holdings	Brazil	2	0	0	2
Indian Oil	India	1	0	0	1
Koç Holding	Turkey	1	0	0	1
Occidental Petroleum	USA	1	0	0	1
Petronas	Malaysia	1	0	0	1
Reliance Industries	India	1	0	0	1
Sinopec	China	1	0	0	1
Total	France	1	0	0	1
Valero	USA	1	0	0	1
Total		76	31	17	124

Source: From survey using NVIVO® 10 software.

Table 4. Characteristics of companies grouped by level of carbon emission disclosure.

Level of Carbon Emissions Disclosure	Characteristics
High	<p>Companies placed at the top of the 2011 Fortune Ranking</p> <p>Predominant normative isomorphism</p> <p>From advanced economies (USA, Japan and Europe)</p> <p>High pressure from stakeholders to engage in climate change projects</p> <p>Positive effect on social legitimacy</p>
Poor	<p>Companies placed at the bottom of the 2011 Fortune ranking</p> <p>Poor coercive and mimetic isomorphism (response is limited to meeting legal requirements which do not include GHG limits)</p> <p>From emerging economies (Latin America and Asia)</p> <p>Low pressure from stakeholders to engage in climate change projects</p> <p>No reflection on social legitimacy</p>

Source: From survey.

climate change projects. The reports published by Exxon (US) and Chevron (US), which are at the top of the *Fortune* ranking, displayed the highest levels of disclosure. On the other hand, another US company, Valero, displayed the lowest levels of disclosure, with almost no use of climate change key words. These results suggest that institutional pressure on US companies was not primarily coercive or mimetic, as seen on Table 4.

The dendrogram illustrates similarities in climate change key word usage related to GHG inventory, climate strategy and carbon disclosure. The cluster analysis revealed that companies with high levels disclosure were also at the top of the *Fortune* ranking, suggesting that the larger and more visible the company, the more susceptible to institutional pressure. The cluster analysis confirmed the ambiguous behavior of the US companies. This reinforces the notion that the normative pillar is the predominant form of institutional pressure. Multinationals are subject to greater stakeholder pressure to engage in climate change projects. Thus, the observed response was based primarily on local institutional normative pressure.

Nevertheless, Chinese companies such as Sinopec and CNPC performed poorly in terms of disclosure of climate change projects despite their favorable position on the *Fortune* ranking. This reactive behavior can be explained by the fact that social issues receive more attention than investments in climate change projects. Escobar and Vredenburg (2011) claimed that societies in emerging economies can contribute to an anthropocentric view of development, while companies from more advanced economies may favor sustainable development. Developing climate change projects may not be as important as the need for social investment to fight poverty.

The content analysis shows that the three types of isomorphism (normative, coercive and mimetic) were present simultaneously in our sample. However, normative isomorphism was by far the most important strategy of acquisition of legiti-

macy through the adoption of practices of corporate social and environmental responsibility, with emphasis on climate change projects. According to Campbell (2007), companies are more likely to have a responsible conduct when they are subject to coercive forces or normative pressure from industry association and also recognized that the institutional dynamics affect the adoption of sustainable development in business.

Machado-da-Silva and Barbosa (2002) pointed out that the institutional pillars are not mutually exclusive but should rather be seen as analytical alternatives to understand different aspects of the same phenomenon. Multinational companies are not likely to adopt strategies of sustainable development unless they are subject to coercion pressure from regulatory agencies or from the industry itself. Pressure may also come from models of successful alignment with sustainable development in which business practices have remained attractive enough to keep the organization motivated to compete.

According to institutional scholars DiMaggio and Powell (1983), this process is conducive to coercive isomorphism (induced by regulators), as companies employ similar business strategies to deal with pressure for sustainable development, or to normative isomorphism (induced by the industry). As a result, the existence of successful models leads to mimetic isomorphism (induced by competitors, for example).

In their quest for social legitimacy, organizations tend to emulate each other. This homogenization comprises both organizational structures and practices. According to Meyer and Rowan (1977), the tendency towards similarity between firms in the same sector, such as the adoption of socially responsible behaviors, increases an organization's chances of survival on the market. Machado-da-Silva and Barbosa (2002) claimed that when an organization adheres to socially responsible practices accepted and valued by the community, this behavior not only legitimizes it but also favors survival.

CONCLUSION

This study analyzed the effect different institutional environments have on climate change projects of oil and gas companies. The content analysis of sustainability reports of oil and natural gas companies published in 2012 shows that companies which have high level of climate change disclosure are subject predominantly to normative isomorphism. It is related to appropriate behavior internalized as a code of conduct and confers institutional legitimacy on a company. Thus, the quest of multinationals for organizational legitimacy rests on the normative pillar. The results indicate that legitimacy is based on the adoption of standards derived from social values.

Coercive isomorphism is necessary to induce the development of climate change projects. At the moment, there is no effective plan of actions to reduce GHG emissions or mitigate the impacts. It is also necessary to have sufficient information and technology on changing climate patterns to secure mimetic isomorphism.

The study is not without limitations. Initially, the sample needs to be expanded to represent the industry in general. Oil and gas companies represent a sector on which stakeholders exert significant and positive influence towards proactive environmental management and climate change projects. Therefore, our results cannot be extrapolated to other companies or sectors. Another possible limitation is the fact that the data were collected in 2011. However, the organizational field reflects a long term institutional setting. In addition, content analysis is a subjective technique. Interpretation of the findings depends on previous knowledge and understanding about the topics involved. It is important to have more information, like a temporal series.

Despite these limitations, the study demonstrates that the effects of the company's strategic decisions are reflected in its sustainability reports and are influenced by the institutional dynamics in which companies operate. It is important to note that voluntary disclosure of climate change projects may not be representative of actual environmental performance. Companies could have a responsible behavior and not disclosure carbon control issues because it is not mandatory. Thus, our research shed light on the importance of viewing climate governance from a broader and institutional perspective.

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