Accounting Forum xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Accounting Forum

journal homepage: www.elsevier.com/locate/accfor

Climate change reporting and multinational companies: Insights from institutional theory and international business

Breeda Comyns

Kedge Business School, Rue Antoine Bourdelle, Domaine de Luminy BP 92, 13 288 Marseille Cedex 9, France

ARTICLE INFO

Keywords:
Climate change reporting
Institutional theory
International business
Multinational company
Sustainability reporting
MNC typology

ABSTRACT

Multinational companies (MNCs) have an important impact on climate change, but knowledge on the greenhouse gas (GHG) reporting practices of MNCs is limited. A theoretical framework is developed to provide an explanation of GHG emissions reporting by MNCs. The framework combines institutional theory with the notion of MNC typology from International Business and explains how institutional pressure acting on each typology of MNC influences standardization of reporting practices and GHG emissions data quality. Propositions are developed and empirically investigated using a case study. Global MNCs are predicted to have better quality GHG emissions reporting compared to multi-domestic or transnational MNCs.

1. Introduction

The 2015 Paris Agreement marks an important step in tackling global climate change, as world nations agree a path forward to reduce greenhouse gas (GHG) emissions and keep global warming below 2 °C. Although companies were not directly involved in the Paris negotiations, more than 500 registered their support by signing the Paris Pledge for Action (University of Cambridge Institute for Sustainability Leadership (CISL), 2015). By signing this pledge, companies agree to implement and even exceed commitments made by governments under the Paris Agreement. Companies and in particular multinational companies (MNCs) have an important impact on climate change. A 2014 study found that MNCs in the fossil fuel and cement industries are amongst 90 "carbon majors" responsible for significant historical anthropogenic greenhouse gas (GHG) emissions (Heede, 2014). Reporting on GHG emissions by companies is important to understand their impact on climate change and to track GHG emissions performance. While there is a significant body of literature providing a very broad range of perspectives on accounting and reporting of climate change with recent special issues in journals such as *Accounting, Organizations and Society, Accounting, Auditing and Accountability Journal* and *Journal of Cleaner Production* (see de Aguiar & Bebbington, 2014), particularly relevant in this context is the subset of this literature which deals with the quality of reporting on climate change. Extant research has found widespread quality problems regarding company GHG reporting. For example, reported GHG emissions data have been found to be incomplete, failing to cover all of the company operations (Liesen, Hoepner, Patten, & Figge, 2015). Data reported have been criticized as not useful for decision making (Andrew & Cortese, 2011; Haigh & Shapiro, 2011; Sullivan & Gouldson, 2012) with emissions data not additive at different levels of aggregation (firm, industry and national level) (Haslam, Butlin, Andersson, Malamatenios, & Lehman, 2014). While an increasing number of studies seek to explain climate change reporting by companies in various country contexts (Dragomir, 2012; Hrasky, 2011; Prado-Lorenzo, Rodríguez-Domínguez, Gallego-Álvarez, & García-Sánchez, 2009; Rankin, Windsor, & Wahyuni, 2011) the number of studies which specifically consider reporting by MNCs and their subsidiaries are still quite rare (Beddewela & Herzig, 2013; Islam & Deegan, 2010). This leaves important gaps in the literature which limit our current understanding of MNC GHG reporting

E-mail address: breeda.comyns@kedgebs.com.

http://dx.doi.org/10.1016/j.accfor.2017.07.003
Received 6 February 2017; Received in revised form 26 April 2017; Accepted 25 July 2017

quality. Some of these limitations will now be outlined.

The climate change reporting literature relies on viewpoints such as legitimacy theory, stakeholder theory and institutional theory to explain organizational GHG reporting practices. Companies may report on GHG emissions to meet societal expectations and maintain legitimacy (Hrasky, 2011) or satisfy stakeholder informational needs (Liesen et al., 2015). There is also the argument that the institutional context in which companies operate is influential and that reporting practices are determined by institutional pressures (regulative, normative or cultural-cognitive) (Aerts, Cormier, & Magnan, 2006; Higgins & Larrinaga, 2014). This literature currently focusses predominately on how GHG reporting practices are shaped by institutional pressures at the level of MNC corporate headquarters (Comyns, 2016; Rankin et al., 2011). This view is limiting as MNCs can operate in tens of countries, each one being a separate institutional environment (with its own rules regulations and social norms) in which legitimacy must be maintained. MNCs also have their own internal organizational field which acts as the institutional environment for the company's subunits (Kostova, Roth, & Dacin, 2008). MNC subsidiaries experience "*institutional duality*" with pressure to maintain legitimacy both in the local institutional environment as well as within the MNC organization (Kostova & Roth, 2002). It has been shown in separate studies that both global pressures (Islam & Deegan, 2010) as well as internal organizational pressures (Beddewela & Herzig, 2013) impact sustainability disclosure practices, but these dual pressures have not been considered together. Considering only the institutional context of the corporate headquarters, or either global or internal institutional pressure is inadequate to explain the practices of an organization which spans multiple different institutional contexts as well as having a specific internal institutional environment.

The climate change reporting literature has to date given little consideration to the international business aspect of MNC operations (Kolk, 2010). The International Business literature concerns itself with the study of companies where activities extend from one country to another, with the MNC being central in this context (Morrison & Inkpen, 1991). This literature body identifies that there are different typologies of MNC. These have been termed global, multi-domestic and transnational (Ghoshal & Bartlett, 1990; Harzing, 2000). This classification is based on organizational structure and the strategies adopted by companies in the product-market environment. In each case, MNC subsidiaries have different levels of interdependence and responsiveness to the local context (Harzing, 2000). There is evidence to suggest that company strategy on corporate social responsibility (CSR) seems to conform to MNC organizational strategy (Husted & Allen, 2006), so it is likely that disclosure practices will likewise be influenced by organizational strategy. Current studies on sustainability disclosure consider MNCs as a single organizational type (see for example Beddewela & Herzig, 2013; Comyns, 2016) and do not take into account that within this broad classification there are important differences.

In terms of MNC environmental performance, an important aspect discussed in the International Business literature is whether MNCs adopt standardized levels of environmental management practices and performance throughout the organization or whether they adapt practices in line with local institutional contexts (Aguilera-Caracuel, Hurtado-Torres, Aragón-Correa, & Rugman, 2013; Ang & Massingham, 2007). Some authors argue that by operating transnationally MNCs can take advantage of countries with lax environmental regulatory requirements and situate polluting activities in so called "pollution havens" (Cole & Elliott, 2005). However, MNCs may adopt standardized environmental practices which can exceed host country regulatory requirements (Aguilera-Caracuel, Aragón-Correa, Hurtado-Torres, & Rugman, 2012; Christmann, 2004). In terms of climate change reporting, the Greenhouse Gas Protocol (WBCSD & WRI, 2004) recommends that "standardized reporting formats be used to ensure that data received from different business units and facilities is comparable, and that internal reporting rules are observed" (WBCSD & WRI, 2004, p. 45). MNC subsidiaries should therefore collect and measure emissions data in a consistent way so that they can be accurately aggregated at the level of the corporation. Data from different facilities can have problems of comparability and compatibility with compatibility problems arising due to differences in sampling procedures or data formats (Köhl, Traub, & Päivinen, 2000). Although the literature on climate change reporting considers difficulties around accounting and reporting of corporate carbon footprint emissions, including the malleability of the reporting boundary as well as evolving measurement methodologies and conversion factors (Andrew & Cortese, 2011; Haslam et al., 2014), the importance of standardization of reporting practices within the organization needs to be given greater consideration (Dragomir, 2012).

In this paper a theoretical framework to explain GHG emissions reporting by MNCs is developed. The framework combines institutional theory, focusing on institutional duality, with the notion of MNC typology from International Business. The framework explains how institutional pressure acting on each typology of MNC influences standardization of carbon reporting practices and so GHG data quality. In the final part of the paper an initial empirical investigation of the propositions developed is carried out using a case study. The case study examines the quality of GHG reporting by three oil and gas companies (ExxonMobil, Royal Dutch Shell and BP), representing different MNC typologies. It is found that all MNC typologies do not have the same approach to standardization of reporting practices which in turn will influence the quality of reported data. Global MNCs are much more likely than multi-domestic or transnational MNCs to standardize reporting practices and so are more likely to report better quality GHG emissions data.

This article contributes to the literature which focuses on the quality of climate change reporting. It provides a more thorough understanding of the climate change reporting practices of MNCs, explaining specifically the quality of GHG emissions data reported. The framework developed offers an alternative explanation for observed poor quality reporting of GHG emissions, highlighting the fact that MNC typology is likely to be an important antecedent. This framework is useful to explain problems around why MNCs may not transparent about the methodologies used to report GHG emissions (Dragomir, 2012) or why companies do not adequately describe emissions from subsidiaries (Sullivan, Crossley, & Kozak, 2008). The results also offer insights for policy makers. Findings highlight that the requirements of current reporting frameworks are not always consistent with the internal organization of MNCs, so even where organizations attempt to use accepted frameworks, as a result of competing institutional pressures, this will not always result in good quality emissions data. This study also answers the call for more research into sustainability reporting practices among MNCs (Beddewela & Herzig, 2013; Islam & Deegan, 2010; O'Dwyer, 2005) and by considering the international business aspect in the

context of GHG reporting, it opens up avenues for future research in this area.

The remainder of the paper is organized as follows. The paper is divided into two sections. In the first section, the theoretical background is provided and the framework to explain GHG emissions reporting by MNCs is developed. In the second section a case study on three large oil and gas MNCs is presented. This serves as an initial empirical investigation of the theoretical framework developed.

2. Theoretical background

In this section the theoretical background used in the study is described. Firstly, the link between standardization of reporting practices and GHG emissions reporting quality is explained. Secondly, institutional theory in the context of MNCs is outlined. This discussion focuses on the notion of institutional duality and so how MNC subsidiaries are subject to both internal as well as external institutional pressures. Thirdly, institutional pressures related to climate change reporting across geographical contexts is discussed. This highlights how MNC subsidiaries are likely to face different pressures in line with in the contexts in which they operate. Finally, the three typologies of MNC are outlined. Their structures and strategies are highlighted to illustrate differences between each one.

2.1. Standardization of reporting practices and GHG emissions reporting

Standardization focuses on a generally accepted and followed system and may be interpreted as a 'top-down' approach (Köhl et al., 2000). Standardization is also associated with the generic term unification and reduces organizational complexity (Aguilera-Caracuel et al., 2012). Reporting standards which describe how GHG emissions should be measured and reported, namely the Global Reporting Initiative (GRI) guidelines and the GHG protocol require standardized measurement of GHG emissions (Chatterjee, 2012). While the GRI guidelines are less detailed on how GHG emissions should be measured and reported, the guidance given is based on the GHG protocol (Global Reporting Initiative, 2013). The GHG protocol (WBCSD & WRI, 2004) states that in order for companies to provide a faithful, true and fair account of emissions generated then accounting and reporting needs to be based on a set of quality principles namely; relevance, completeness, consistency, transparency and accuracy (WBCSD & WRI, 2004). To ensure that greenhouse gas (GHG) emissions reported at the corporate level meet these quality principles the protocol goes on to state that "it is recommended that standardized reporting formats be used to ensure that data received from different business units and facilities is comparable, and that internal reporting rules are observed standardized formats can significantly reduce the risk of errors" (WBCSD & WRI, 2004, p. 45). Therefore all facilities should collect and measure emissions data in a consistent way. The measurement methodology for emissions must be set at the level of the organization as there are different methodologies that can be used including; direct measurement of GHG emissions, mass balance calculation or calculation from fuel use data. In addition, the GHG protocol recommends that for internal reporting up to the corporate level, standardized reporting formats should be used to ensure that data from different subsidiaries is comparable and that the risk of errors is reduced (WBCSD & WRI, 2004). The GHG protocol clearly specifies the requirement for standardization of environmental operational policies and not only environmental communication, the latter, which may only give the notion that policies are standardized (Christmann, 2004).

In order to now consider the issue of standardization of GHG reporting practices within the MNC, institutional theory in the context of MNCs is firstly outlined. This focuses on explaining how MNC subsidiaries can be subject to both internal as well as external institutional pressures.

2.2. Institutional theory and MNCs

Institutions are defined by Scott (2013, p. 56) as follows: "institutions comprise regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life". The regulative pillar is based on the establishment, monitoring and enforcement of rules and regulations. The normative pillar rests on defining goals and the appropriate ways in which to pursue these goals The cultural-cognitive pillar highlights individual human response to the external world which are shaped by cultural frameworks (Scott, 2013; Xu & Shenkar, 2002). Institutionalized practices are effectively beyond the discretion of the organization (Hoffman, 1999; Meyer & Rowan, 1977). As social processes become enshrined and institutionalized, organizations are motivated by legitimacy concerns to change their organizational structure and incorporate these practices.

An organizational field is a recognized area of institutional life. Organizational fields may consist of an industry sector or they may also form around certain issues (Hoffman, 1999; Wooten & Hoffman, 2008). Companies within the same organizational fields will adopt similar structures and practices through the process of isomorphism. Coercive, mimetic or normative isomorphism result in organizations adapting their processes to match their institutional environment (DiMaggio & Powell, 1983). Coercive isomorphism is as a result of formal and informal pressures including responding to government regulation. Mimetic isomorphism occurs where companies copy or mimic the practices of other organizations in the field while normative isomorphism is as a result of professionalism of the field (de Villiers & Alexander, 2014; DiMaggio & Powell, 1983). Organizations in effect change their practices according to their institutional context.

The literature suggests that multinational companies (MNCs) are part of a global class of organization that share common values and patterns. Because of their transnational nature, MNCs face local as well as global pressures which can be extremely diverse. According to Kostova et al. (2008, p. 998) "MNCs across countries and industries belong to an institutional class or field that operates according to particular rules, logic, and norms" and so, at the meta level, MNCs operate within their own organizational field.

Additionally it is proposed that MNC's have their own internal organizational field or intra-organizational field which acts as the institutional environment for the company's subunits (Kostova et al., 2008). In effect MNCs operate in two distinct domains namely the national and the international domains (Rosenzweig & Singh, 1991). Subsidiaries of MNCs will experience isomorphic pressure both from the local institutional context (country in which it operates) as well as from the intra-organizational institutional context (Kostova et al., 2008; Rosenzweig & Singh, 1991).

Rosenzweig and Singh (1991) identify how any element of organizational structure can be depicted in terms of the isomorphic pressures faced by subsidiaries within the local environment and also within the structure of the MNC. These different pressures also explain how the structures within the MNC can vary. When pressure for internal consistency within the MNC organization is high, then there is little variation between subsidiaries of the MNC. However, if the pressure for internal consistency is not high, then local pressures can be more influential. This dual institutional pressure has been also referred to as *institutional duality* (Kostova & Roth, 2002).

Given the broad diversity of institutional contexts and the unique arrangement of MNCs, these global organizations can choose to which extent they respond to institutional pressures (Kostova et al., 2008). It is expected that some form of isomorphism occurs both at the meta level and at the intra-organizational level organizational fields (Kostova et al., 2008). An MNC must maintain legitimacy both at the level of each subsidiary as well as at the level of the overall organization (Kostova & Zaheer, 1999).

It is likely that MNCs face diverse pressures around the climate change issue in the different institutional contexts in which they operate. Institutional distance is the difference or similarity between the home-country institutional context and host country contexts (Kostova & Zaheer, 1999). This is important as where there are large institutional differences in the regulative, normative or cultural cognitive domains this may further deter standardization of practices (Aguilera-Caracuel et al., 2012; Aguilera-Caracuel, Fedriani, & Delgado-Márquez, 2014; Aguilera-Caracuel et al., 2013). The institutional pressures associated with the climate change issue in different geographical regions are discussed in the next section.

2.3. Climate change and institutional pressure

Differences in institutional pressures both in the formal (regulative) and informal (normative and cultural-cognitive) domains exist around the issue of climate change reporting. In the formal domain, there has been an increase in the number of national and regional level regulations on sustainability reporting generally (KPMG, GRI, UNEP, & Centre for Corporate Governance in Africa, 2016). In the specific area of climate change reporting, various regulatory instruments have been introduced recently including measures for national GHG emissions registries and disclosure of GHG emissions by companies in Spain, Mexico and the UK (KPMG et al., 2016). Since 2015, under the Energy Transition Law, French listed companies are required to disclose risks related to the effects of climate change. Reporting is also required under emissions trading schemes, such as the EU Emissions Trading Scheme (EU ETS), the US based Regional Greenhouse Gas Initiative (RGGI) and the New Zealand Emissions Trading Scheme. There are also mandatory greenhouse gas reporting regimes in place in the US, Canada, France, Japan and Australia, all requiring emissions reporting to a regulatory authority (KPMG et al., 2016; KPMG, UNEP, Global Reporting Initiative (GRI), & Unit for Corporate Governance in Africa, 2010). The number of regulations is only set to increase following the Paris Agreement in 2015 (KPMG et al., 2016). Given the upsurge in various reporting regimes, it is likely that MNCs may find that they have subsidiaries operating within several different GHG reporting regimes, which are also likely to have different reporting requirements.

In the informal domain, voluntary sustainability reporting guidelines and methodologies have been designed to ensure that reporting organizations generate reliable and standardized information. Guidelines include the Greenhouse Gas Protocol (WBCSD & WRI, 2004), the International Petroleum Industry Environmental Conservation Association (IPIECA) guidelines (IPIECA/API/OGP, 2010), the EU ETS reporting guidelines well as those specific to national regulation or legislation. This means that there are many competing actors shaping this agenda (Andrew & Cortese, 2011). Specific reporting guidelines or methodologies may be preferred in different institutional contexts, especially if defined by regulation. However, different methodologies or guidelines to calculate GHG data are not necessarily comparable (Andrew & Cortese, 2011). MNC subsidiaries are therefore likely to face institutional pressure to use particular methodologies and guidelines to calculate facility level emissions depending on geographic location. These local institutional pressures can lead to difficulties in implementing a single standard practice throughout the MNC organization.

In terms of the cultural-cognitive domain, A 2013 study by the Pew Research center found that there are large differences in global attitudes towards the perceived importance of climate change (Kohut & Pew Research Centre, 2013). The study finds that citizens in Europe, Asia, Africa, Canada and Latin America are generally more concerned compared to Americans. In a 2015 follow up study, the Stokes, Wike, and Carle (2015) reports that even within some large economies such as the US, Australia, Canada, Germany and the UK, there are deep divides on the issue linked to political conviction. It is also found that those countries which emit the most greenhouse gas emissions are also those where the public demonstrate least concern on the climate change issue (Stokes et al., 2015). Therefore, there are countries where much more importance is given to climate change and others where it is generally of less concern. The level of societal concern is also likely to influence whether or not MNC subsidiaries will feel pressure to report GHG emissions to stakeholders in their specific contexts.

Historically there existed a rift between the political approach to climate change in the US and Europe, culminating in the failure of the US to ratify the Kyoto Protocol at the end of the 1990s. However, under the 2015 Paris Agreement, countries from across world have come together to set out a plan to limit global warming to 2 °C or less. Many nations have now submitted their planned contributions to the global goal through Intended Nationally Developed Contributions (INDCs) (UNFCCC, 2016). However, political leadership and opinion is not stagnant and changing political situations can re-create divisions at the global level. For example

progress towards GHG emissions commitments in the US may be threatened by the policies of the newly inaugurated president, Donald Trump. The recently elected president has publicly stated that he does not support the climate change policies of the previous administration and plans to support fossil fuel projects and end the US Clean Power Plan (McKibben, 2016). Although it remains to be seen what actions will actually be taken, it is clear that the political context for companies operating within the USA is likely to change and so also institutional pressure on the climate change issue. This example highlights how a change in government policies can mean a shift in company priorities (Prahalad & Doz, 1999). Since the climate change issue is also linked to the political context, it is likely that MNCs and their subsidiaries will experience different levels of government pressure depending on the jurisdictions in which they operate.

This section highlights the diverse external institutional pressures that MNC subsidiaries experience in both the formal and informal domains worldwide. MNC subsidiaries will experience different institutional pressures depending on the country context. However, all MNCs are not of the same type, but display important differences in terms of strategy and organizational structure, which can determine how they are likely to respond to these external institutional pressures. The three typologies of MNC are described in the next section.

2.4. MNC typology

As defined by Morrison and Inkpen (1991, p.145) “International business involves theories of the MNE, the relationship of the MNE with its environment (markets, governments, industries), issues of comparative management, and topics related to the functional and/or operational activities of the MNE”. Within this literature body which focuses on MNC organizations, different typologies of MNC, namely global, multi-domestic and transnational (Ghoshal & Bartlett, 1990; Harzing, 2000) have been identified. This classification is based on organizational structure and the strategies adopted by companies in the product-market environment. In each case, subsidiaries have different levels of interdependence and responsiveness to the local environment (Harzing, 2000). Global MNCs are those which are highly integrated and have a low level of response to particular local environments. In the product market environment, Global MNCs tend to be lean with high levels of efficiency and achieving economies of scale (Harzing, 2000). Companies in the pharmaceutical industry or telecommunications industry may adopt global strategies given that products are generally standardized (Harzing, 2000; Husted & Allen, 2006). Multi-domestic MNCs in contrast are organized autonomously with products and services designed to meet the needs of local markets, for example the food industry (Harzing, 2000). Transnational MNCs combine elements of both the global and multi-domestic typologies, attempting to respond to the needs of local markets while at the same time achieving global efficiency and economies of scale (Harzing, 2000).

CSR strategies within MNCs have likewise been classified as global, local (Hah & Freeman, 2014; Husted & Allen, 2006) and transnational (Filatotchev & Stahl, 2015). Where an MNC adopts a global approach, the perspective from the company headquarters is prevalent. There is a high level of consistency throughout the organization with global integration and standardization of practices. In this case, universal guidelines may be devised and implemented across the entire organization. This ensures a very high level of consistency within the organization but the needs of local stakeholders may be ignored (Filatotchev & Stahl, 2015; Hah & Freeman, 2014). Where an MNC adopts a more local approach to CSR, local concerns are given priority over global consistency. This can lead to greater flexibility and a better response to local concerns. This is opposite to the global approach as it focuses on the need to respond to host country conditions as a priority. While this approach leads to a greater responsiveness to local environments, it can also mean that where countries do not have laws or strict enforcement of legislation then MNCs also follow more relaxed standards of CSR. A local approach means that it is more difficult to achieve consistency and high levels of performance within the organization (Filatotchev & Stahl, 2015). A transnational approach to CSR attempts to reconcile tensions between local and global issues and so there is recognition that local and global issues are not mutually exclusive (Filatotchev & Stahl, 2015). Companies adopting this approach respond to local concerns at the same time as responding to global issues. In this case, there is a global map or template for coordination of global CSR activities but this also allows subsidiaries to adapt according to local stakeholder needs (Filatotchev & Stahl, 2015). This approach can allow companies to reach a balance between global consistency and local adaptation.

Husted and Allen (2006) find that CSR strategy seems to conform to the MNC organization strategy in the case of MNCs in a developing country context. The authors find that multi-domestic and transnational MNCs place greater importance on country specific or local CSR issues compared to global companies. The results of the study support the institutional approach in that it is likely that the CSR function within an MNC, given its dependence and interaction with other functions within the organization, will imitate patterns established by market-facing functions (Husted & Allen, 2006) and effectively adopt a similar approach. Although climate change is a global issue, since it transcends national boundaries (Husted & Allen, 2006), it is likely that the approach adopted by the MNC to report on this issue will be influenced by overall organizational strategy in the same way that CSR strategy is influenced by the organizational strategy. Along similar lines Christmann (2004) finds that global standardization of functional strategies contributes to global standardization of environmental policy.

Given the different structures and strategies of the three typologies of MNC is it likely that each responds to internal and external institutional pressures differently while will ultimately determine how likely it is that standardized reporting practices will be implemented. In the next section, the elements of institutional duality and MNC typology are brought together to develop a theoretical framework to explain standardization practices and, in turn, GHG emissions reporting quality by MNCs.

3. Theoretical framework: GHG reporting and MNCs

In this section, the theoretical framework to explain GHG emission reporting quality by MNCs is developed and described. The

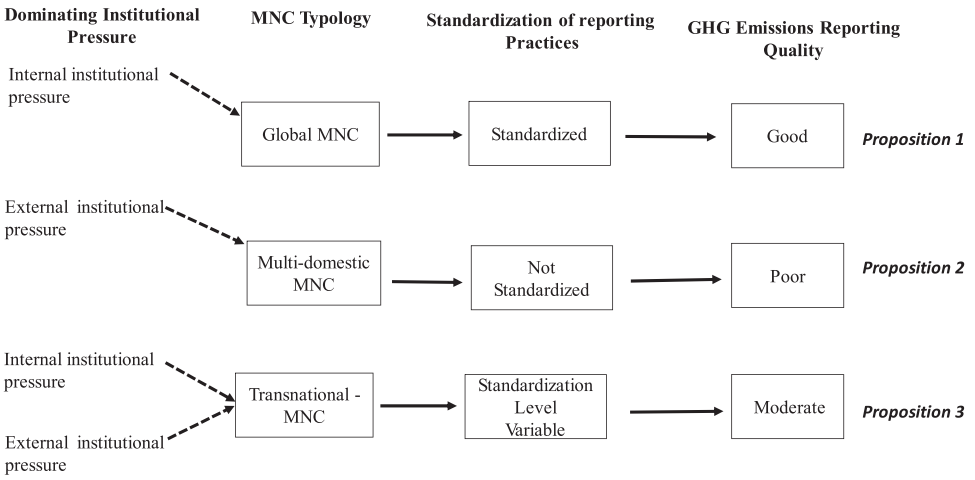

Fig. 1. Theoretical Framework: GHG reporting and MNCs.

framework is presented in Fig. 1.The dominating institutional pressure (internal or external) for each typology of MNC is identified. The effect of this institutional pressure is then explained in terms of internal standardization of GHG reporting practices and expected reporting quality outcomes. In the case of each MNC typology, predicted outcomes are presented as propositions.

3.1. Global MNCs: standardization and reporting on GHG emissions

Global MNCs are typically highly integrated organizations. In this case strategic functions are often centralized at company headquarters and manufacturing may be restricted to a limited number of locations (Harzing, 2000). There is typically high inter-dependence between subsidiaries and also between company headquarters and subsidiaries. In the case of global MNCs, there is likely to be more pressure on subsidiaries to maintain legitimacy inside the organization, compared to maintaining legitimacy within the local institutional environment (Rosenzweig & Singh, 1991). In this way the dominant institutional pressure on MNC subsidiaries is likely to be internal rather than external.

Global MNCs are likely to adopt a standardized mandate and requirements for climate change reporting. This mandate will typically come from company headquarters and each subsidiary will be required to provide information and to report according to these corporate requirements. Local institutional pressures will have less influence on reporting practices. Where local regulations exist, the individual subsidiary will conform to maintain legitimacy, but subsidiaries of global MNCs may be less susceptible to normative or cultural-cognitive pressures in local institutional environments (Kostova et al., 2008). A global approach is likely to result in more centralized accountability systems with vertical communication between the company headquarters and local subsidiaries (Filatotchev & Stahl, 2015). This is likely to lead to consistent accounting and reporting formats throughout the company with good intra-organizational consistency. This approach may result in poor accountability to a wide number of company stakeholders in multiple local institutional environments. However, at the level of the corporation, it will be much easier to collect and aggregate information from individual subsidiaries since each will collect and report information according to the same mandate.

Proposition 1. *Global MNCs are likely to standardize environmental GHG reporting practices throughout the organization and so will have good quality reporting on GHG emissions at the corporate level.*

3.2. Multi-domestic MNCs: standardization and reporting on GHG emissions

Multi-domestic MNCs have been described as “a loosely coupled federation of rather independent subunits” (Harzing, 2000, p. 109). In this case the subsidiaries of the MNC have important ties with the local environment and can be quite independent from the rest of the company. The organization is decentralized and there are generally loose ties between subsidiaries as well as between company headquarters and each subsidiary. This means that it is likely that there will to be more pressure on each subsidiary for legitimacy within the local environment compared to pressure for legitimacy within the MNC organization (Rosenzweig & Singh, 1991). In this case the dominant pressure on MNC subsidiaries is likely to come from the external rather than the internal institutional context. It is unlikely that such a structure will be pre-disposed to implementing standardized practices throughout the organization. Individual subsidiaries of MNCs will be very susceptible to local institutional pressures. This means that where regulation on climate change reporting exists, subsidiaries will conform and ensure compliance as a priority. However, since ties with other subsidiaries in the MNC as well as company headquarters are loose it is unlikely that reporting practices on climate change will be transferred within the MNC. This is even less likely with greater location diversity and were institutional distance is higher (Kostova & Roth, 2002). It is also expected that local cultural-cognitive norms would be very influential and subsidiaries are likely to mimic the behavior of companies operating in the same institutional environment.

Multi-domestic companies are likely to have a very local approach to climate change reporting. It is unlikely that there will be much consistency between the data collection practices of various subsidiaries. Subsidiaries in non-regulated areas are unlikely to collect and report information. Reporting on climate change is also unlikely to be prioritized by subsidiaries operating in regions where there is little societal concern around the climate issue. It is likely that there will be good accountability on climate change to stakeholders in regulated areas and in areas where there is pressure by stakeholders to provide information but little or no accountability by subsidiaries in unregulated areas. This will mean that preparation of a corporate level report on climate change and GHG emissions, involving aggregation of information from individual subsidiaries will be extremely difficult. It is likely that there will be good information from some subsidiaries with little or no information from other operations. In this case it is likely that GHG emission reporting by a multi-domestic MNC will be of poor quality and will not reflect actual climate impact. Such reporting is likely to demonstrate many of the reporting problems noted by researchers for example that reports do not cover all operations, are not consistent and cannot be compared between years (Comyns & Figge, 2015; Liesen et al., 2015).

Proposition 2. *Multi-domestic MNCs are unlikely to standardize GHG reporting practices throughout the organization and so will have poor quality reporting on GHG emissions at the corporate level.*

3.3. Transnational MNCs: standardization and reporting on GHG emissions

Transnational MNCs combine aspects of both the global and local MNC typologies. These MNCs are integrated and subsidiaries are interdependent. However, unlike global MNCs, subsidiaries can also have strategic roles and the interdependence between individual subsidiaries can be higher than between subsidiaries and company headquarters (Harzing, 2000). In this case subsidiaries will experience "*institutional duality*" with strong pressure to maintain legitimacy both in the local institutional environment as well as within the MNC organization (Kostova & Roth, 2002). Therefore, subsidiaries of transnational MNCs will not be subject to a dominating internal or external institutional pressure, but will rather attempt to balance these.

Given the strong link with the local institutional environment, it is likely that individual subsidiaries will be susceptible to local institutional pressure. Where regulations exist, subsidiaries will comply. Given the strong interdependence between subsidiaries it is likely that there will be good links, communication and transfer of people between subsidiaries. Therefore, it is also likely that reporting practices may be shared between subsidiaries, especially between those facing similar institutional pressures. While normative and cultural-cognitive pressures are likely to be important in the local institutional contexts of subsidiaries, given the need for intra-organizational legitimacy, it is also possible that there may be mimicry between subsidiaries. In addition to local institutional pressures, subsidiaries will also experience pressure to comply with a global mandate as specified by company headquarters (Filatotchev & Stahl, 2015).

A transnational approach to reporting on climate change is likely to result in non-hierarchical systems of communication and so accountability to a broader set of stakeholders. It is likely that there will be a standardized reporting mandate calling for consistency (Filatotchev & Stahl, 2015). Thanks to the global mandate, the organization will be able to collect and aggregate information from subsidiaries but the quality of the information may be variable depending on how closely the subsidiary follows the global mandate and on whether climate change reporting is a local priority or not.

The structure and the strategy of the transnational MNC is conducive to implementation of standardized reporting practices, however in this case institutional distance is likely to very important. If the institutional distance between the home and host institutional contexts is low then it is likely that a global mandate can be followed and that GHG reporting practices can be standardized throughout the organization. Where institutional distance is high then this is more difficult to achieve standardization as subsidiaries balance local and intra-organizational institutional pressures. It is likely that transnational MNCs will be more successful at implementing standardized reporting practices compared to multi-domestic MNCs and potentially less successful than global MNCs. However, if institutional distance is low then it is likely that the transnational MNC can be as successful as the global MNC at standardizing practices. The final quality of reporting on GHG emission is expected to be moderate, lower than that by global MNCs but better than reporting by multi-domestic MNCs.

Proposition 3. *Transnational MNCs are likely to have a variable approach to standardization of GHG reporting practices and will have moderate quality reporting on GHG emissions at the corporate level.*

4. Case study: oil and gas companies

To give some empirical insights in support of the framework and propositions developed in the previous section, the reporting practices of three MNCs in the oil and gas industry are now considered. The climate change reporting practices of Exxon Mobil (global MNC), Royal Dutch Shell (multi-domestic to global MNC) and BP (transnational MNC) between 1998 and 2015/2016 are analyzed. Reports to 2016 are analyzed in the cases of BP and Royal Dutch Shell and reports to 2015 are analyzed in the case of Exxon Mobil. This reflects the most recent reports available for each company. Considering reporting quality longitudinally allows visibility and comparability of reporting trends over time which is useful in this context. Classification of the strategic approach of each of the MNCs is based on previous literature as well as the language used in company documents. Prior to describing the results, the methodology used to measure the quality of climate change reporting is described in the next section.

Table 1
Content analysis index for measuring GHG reporting quality.

Quality Dimension	No.	Criterion
Accuracy	1	Apart from the assurance statement, the report includes measures taken to ensure the accuracy of the emission estimation process i.e. details of internal processes or auditing procedures for verifying data
Completeness	2	Scope 1 CO_2 emissions are reported
	3	Scope 2 CO_2 emissions are reported
	4	Scope 3 CO_2 emissions are reported
	5	Global Warming Potential − Emissions data for all direct GHG emissions are reported in tonnes of CO_2 equivalents using a recognised GWP.
Consistency	6	Consistency in reporting boundary, accounting approach and data reported
	7	Reporting of normalised data (for example tonnes of CO_2 per barrel of oil produced) which is comparable between years.
	8	Standards − The report refers to whether GHG or CO_2 data is reported in accordance with internal or external reporting guidelines
	9	Performance − The company performance in terms of setting and achieving quantitative GHG emission reduction targets is reported
Credibility	10	There is an assurance statement which includes the assurance of GHG or CO_2 data.
	11	Company contact Information is provided in the sustainability report
Relevance	12	The Company reports absolute levels of quantitative greenhouse gas emissions.
	13	The boundary for the greenhouse gas inventory is described and the GHG data reported is complete given the boundary definition
Timeliness	14	The reporting period which the data covers is outlined in the sustainability report
	15	There is a consistent reporting schedule
Transparency	16	The methodologies which have been used to calculate or measure emissions are outlined
	17	All terms and jargon are clearly explained
	18	The GHG data that the company is reporting is clear. It is clear whether the company is reporting on Scope 1, Scope 2 or Total CO_2 data. Where GHG data is reported it is clear which pollutants this data includes.

4.1. Methodology −measurement of climate change reporting quality

A content analysis index is used to measure the quality of GHG reporting in the sustainability reports of the three oil and gas companies. Sustainability reports for each of the three companies were downloaded from the internet. The methodology used to measure GHG reporting quality follows that described by Comyns and Figge (2015). The index was developed by linking dimensions of quality with reporting requirements around greenhouse gas emissions. Seven principles of quality in the context of GHG reporting are included. These principles are relevance, completeness, consistency, credibility, timeliness, transparency and accuracy. Each quality principle is considered as a dimension of reporting quality and the aggregation as a measure of total quality. Each dimension was operationalized by linking it with reporting requirements principally from the GHG protocol (WBCSD & WRI, 2004) and the Petroleum Industry Guidelines for reporting GHG Emissions (IPIECA & API, 2003; IPIECA/API/OGP, 2011). This results in 18 criteria across the seven quality dimensions (see Table 1). Each criterion was scored on a scale of 0, 1 or 2 depending on whether the criterion was deemed to be 'not reported', 'partially reported' or 'fully reported'. Scoring was carried out according to a set of predefined rules for each criterion. Following these clearly defined rules reduced coder subjectivity. The scores were then aggregated to achieve an overall reporting quality score. The maximum achievable score for GHG reporting quality using this index is 36. Each report in each year for each of the three companies was scored using the described index.

4.2. Description of MNCs

4.2.1. Exxon mobil

Exxon Mobil as a company adopts a global strategic approach. According to the analysis of the company code of conduct carried out by Logsdon and Wood (2005, p. 61) "ExxonMobil's Code of Ethics and Business Conduct acknowledges cultural differences but emphasizes a globally integrated approach to values of honesty and integrity". Grant & Cibin (1996) note that strategic decision making and resource allocation for ExxonMobil occur at corporate headquarters noting "even the seemingly-mundane task of allocating crude oil to refineries presented complex issues which at Exxon (then Standard Oil New Jersey) were handled by the corporate Coordination Department". Furthermore, Exxon Mobil refers to a 'global license to operate' when they state that "performing with the highest ethical standards of business conduct is a key competitive strength — critical to maintaining our global license to operate"(ExxonMobil, 2016). Exxon Mobil emphasizes the importance of global consistency in the context of its code of conduct through its internal auditing process (ExxonMobil, 2016). This all points to a global strategic approach by ExxonMobil.

4.2.2. Royal Dutch shell

The strategic approach by Royal Dutch Shell has evolved since the 1990's (Sluyterman & Wubs, 2010). Royal Dutch Shell traditionally had two headquarter locations, London and The Hague, with each assigned very distinct tasks (Post, Preston, & Sachs, 2002). Within the company primary responsibility remained with the local and regional executives and "Shell remained a highly decentralized company and local Shell managers, whatever their formal titles, were referred to internally as 'barons'" (Post et al., 2002, p. 71). During the 1950's, the management of Shell expected the world to become more fragmented and so focused on integration of operations in the various national business systems (Sluyterman & Wubs, 2010). The strategy of the company at this time was a multi-domestic one (Logsdon & Wood, 2005). In the 1990's, due to globalization, liberalization and pressure for cost

efficiency, the company looked towards adopting a more global approach. A new global business operating model was introduced in 2004. This standardized and simplified business procedures while national considerations at the level of individual subsidiaries became less salient (Sluyterman & Wubs, 2010). In 2005, shareholders voted for the unification of Royal Dutch and Shell Transport (Kwee, Van Den Bosch, & Volberda, 2011). Following the incorporation of Royal Dutch Shell plc in 2005, the Group's dual-ownership structure was merged and the company now operates with a single board and CEO. Royal Dutch Shell changed strategy from a multi-domestic to a global strategy during the early 2000's.

4.2.3. BP

The strategic approach of BP has been discussed by several authors (Husted & Allen, 2006; Logsdon & Wood, 2005). Logsdon and Wood (2005, p. 65) in their analysis of the BP company code of conduct note that "Business Unit Leaders are expected to engage in open dialogue and consultation with local communities and their representatives, non-governmental organizations and government at all levels to ensure that potential issues arising from our operations are identified and the risks addressed". This quotation points to the fact that BP takes into account the requirements of the local communities in which they operate. According to Husted and Allen (2006), this is an indication that BP is a company which responds to local and global CSR issues and so are transnational in their CSR strategy (Husted & Allen, 2006). This transnational approach is also apparent in more recent documents from the company. In a more recent code of conduct, the company states "We want to be a trusted neighbour in the communities where we operate and live. Maintaining an open, ethical stance and respecting diversity, local cultures and customs make a positive difference. We encourage participation in the local community" (BP, 2014). The company commitment to local communities is also echoed by company CEO Bob Dudley in the 2014 letter to stakeholders where he states "I am always conscious that it is by delivering real benefits to the countries where we work that we earn our license to operate" and "we align our interests with those of local economies by using local suppliers, building local capacity and supporting local communities" (BP, 2015a). This indicates that the approach of the company remains consistent with that of a transnational strategy as put forward by Husted and Allen (2006).

4.3. GHG reporting quality: ExxonMobil, Royal Dutch shell and BP

The overall quality of reporting on climate change between 1998 and 2016 by these three oil and gas MNCs is presented in Fig. 2. This Figure shows climate change reporting quality scores for each company in each year relative to the maximum achievable score of 36.

BP and Royal Dutch Shell have published sustainability reports since the late 1990's with Exxon Mobil reporting since 2004. The quality of reporting on climate change by the three MNCs in the early years and throughout the first decade of the 2000's diverged noticeably. Between 2003 and 2008, BP generally had better quality reporting on climate change compared to ExxonMobil and Royal Dutch Shell. However, since 2009 the quality of reporting by BP has declined while that by Royal Dutch Shell improved in 2010. These changes mean that the overall quality of reporting on climate change by the three MNCs has converged since 2010, with very little difference between the companies in terms of reporting quality scores in more recent years. Notable from these trends is that the quality of climate change reporting by BP seems to be the most erratic, fluctuating from a low of 9 points in 2001 to a high of 29 points in 2005 with quality consistently at a level of approximately 23 points in more recent years. Reporting by Exxon Mobil has been more consistent over the period. The quality of reporting by Exxon Mobil initially increased from 14 points in 2004–22 points in 2005. Since 2005 quality has fluctuated very little, staying between 22 and 24 points. The quality of reporting by Royal Dutch Shell

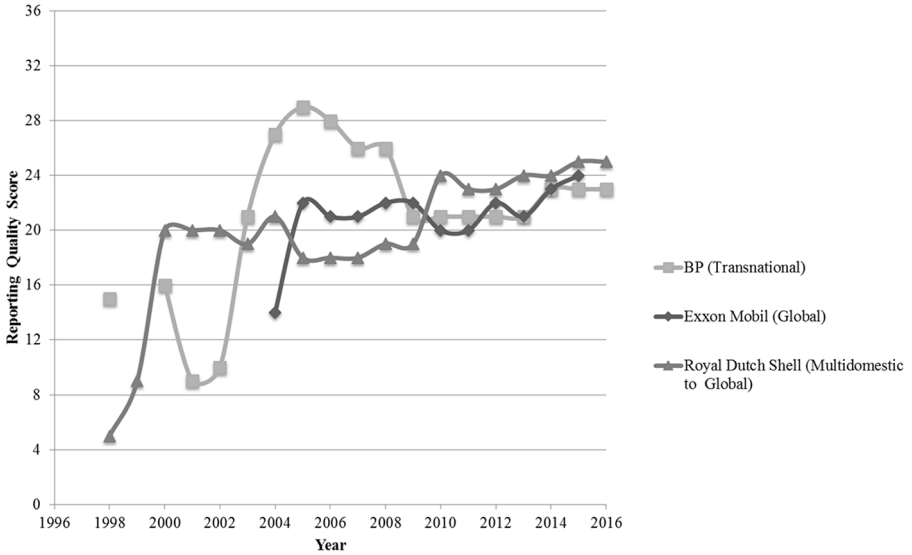

Fig. 2. GHG reporting quality (1998–2016) – ExxonMobil, Royal Dutch Shell & BP.

has been marked by two noticeable increases. The first increase occurred between 1999 and 2000, where quality increased from 9 points to 20 points. Quality remained quite steady between 2000 and 2009, fluctuating between 18 and 21 points. Reporting quality increased quite noticeably again between 2009 and 2010, from 19 points to 24 points, and has remained at this higher level of reporting quality.

These overall GHG reporting quality scores give an insight into how climate change reporting quality aggregated across all of the dimensions considered in Table 1 have evolved for each MNC. An important observation in the case of all three MNCs is that the overall quality of reporting on climate change remains quite poor, well below that laid out in current reporting standards. This is in line with the findings of previous research (Dong & Burritt, 2010; Dragomir, 2012; Liesen et al., 2015). While there were noticeable differences in overall quality scores in the earlier years of reporting, in more recent years these differences have reduced and report quality has converged, but at a substandard level of quality. In terms of overall reporting quality, there is little difference observed in terms of the quality of reporting on climate change by different MNC typologies in recent years. This result also provides some support for the notion that reporting between companies in the same industry sector is likely to converge as a result of mimetic isomorphism (DiMaggio & Powell, 1983). I next consider the quality of reporting on GHG emissions data and whether there is evidence that internal reporting processes and practices are standardized in the case of each of the three companies. This analysis will focus on whether the companies report on the specific methodologies and processes used to calculate GHG emissions and on whether GHG reporting processes or data are assured by a third party. The purpose of third party assurance is to increase confidence in the reliability of information reported by the inclusion of an independent opinion (Owen, Chapple, & Pinilla Urzola, 2009). There are typically two levels of assurance which may be provided, either a reasonable or a limited level which are consistent with a high or moderate level of assurance respectively (Owen et al., 2009). Therefore, the existence of third party assurance and the level of assurance can give an indication of the credibility of the GHG data reported.

ExxonMobil include specific information about data collection processes as well as methodologies to calculate GHG emissions data in their reporting. Exxon Mobil report that they use the American Petroleum Institute developed Compendium of Greenhouse Gas Emissions Estimations Methodologies as the basis for global calculations “unless local regulations require other methods” (ExxonMobil, 2005, p. 24). Here, the company acknowledges that there may be inconsistences between the company standard and local regulations. The company has continued to use these guidelines over the period analyzed, noting in 2012 for example that they also use the Petroleum Industry Guidelines for GHG reporting (ExxonMobil, 2012). In their 2011 report, Exxon Mobil also describe their Environmental Data Management System (EDMS) which is “a system to collect, collate and consolidate site-level data at the corporate level to help manage our environmental performance indicators globally. EDMS is being integrated with existing site-based emissions monitoring and measurement systems to allow us to collect up-to-date, site-specific information” (ExxonMobil, 2011, p. 13). This would point to an internal system to collect data in line with a corporate mandate, characteristic of a global MNC. Furthermore, Exxon Mobil engages a third party to assure its corporate citizenship report annually. This assurance focuses on the processes for reporting health safety and environmental performance indicators and provides a *reasonable* level of assurance. For example, in 2015 the assurance report states that “we believe that ExxonMobil’s reporting processes were effective in delivering safety, health, and environmental indicators that are useful for assessing corporate performance and reporting information consistent with IPIECA/API Guidance (ExxonMobil, 2015, p. 94). Some additional observations by the assurance provider are that ‘processes were in place to ensure that sites contributing to core safety, health and environmental metrics understood corporate reporting obligations and were included in corporate safety, health, environmental and climate change reporting’ and that “guidelines for greenhouse gas emissions reporting were consistent with, and specifically refer to, the API Compendium for Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry (2009)” (ExxonMobil, 2015, p. 94). Exxon Mobil’s explicit references to the standard followed in terms of calculation methodologies used for GHG emissions and subsequent assurance of data collection processes by a third party, giving a reasonable level of assurance would indicate that calculation and reporting processes throughout the organization are likely to be quite standardized and so would give confidence in terms of the quality of the final GHG emissions data reported. However, the assurance of the Exxon Mobil corporate citizenship report does not extend to assuring the accuracy of the data reported.

BP adopt quite a different approach compared to Exxon Mobil. BP do not refer to a specific methodology or standard used to calculate company-wide GHG emissions. In 2004 the company refer to the fact that they use internal guidelines to report on GHG emissions “our emissions are reported according to our internal guidelines, which follow international protocols and industry guidelines (BP, 2004, p. 34), this is in line with the expectation that transnational MNCs will implement companywide guidelines or procedures. However, there is no reference or indication in the reports as to how GHG emissions are calculated for the organization. For example there is no reference to a specific methodology or procedure which is followed. In addition and contrary to the cases of ExxonMobil and Royal Dutch Shell, the GHG inventory boundary reported by BP is not complete. Although BP uses an equity share approach (based on share of ownership in its businesses) when reporting on GHG emissions, the company consistently excludes GHG emissions related its TNK-BP business. This means that the GHG emissions data reported is incomplete. The sustainability reports point to a flexible and decentralized approach to carbon management. In their 2012 report, BP state that ‘we decided that a local approach to GHG emissions management was more practical and we have since focused our efforts on energy efficiency and reducing flaring and venting where it is relevant for local business management’ (BP, 2012, p. 36). BP also implemented its own internal carbon emissions trading system which encouraged subsidiaries to find the most advantageous ways to cut emissions (Victor & House, 2006). This further highlights the fact that carbon management is at the level of the individual facility rather than operating to a corporate mandate, which is in line with what would be expected for a transnational MNC. While BP do provide an assurance statement for its sustainability report annually, this assurance, unlike that of Exxon Mobil, this does not specifically refer to processes for reporting GHG emissions. However, the assurer does refer to carrying out activities relating to testing “whether HSE (Health,

Safety, Environment) data had been collected consolidated and reported appropriately at group level." (BP, 2015b, pg. 52). The assurer also refers in 2015 to "reviewing disaggregated HSE data reported by a sample of 19 businesses to assess whether the data had been collected, consolidated and reported accurately" (BP, 2015b, pg. 52). It is unclear from this whether GHG data specifically is included in this process or what percentage of total GHG emissions these 19 businesses represent. It must also be noted that assurance provided in the case of BP is a *limited* level of assurance which is a reduction in terms of assurance engagement risk with the risk being greater compared to a reasonable level of assurance (International Auditing and Assurance Standards Board, 2008).

In the case of Royal Dutch Shell, the company refer to the methodology used to calculate GHG emissions in their more recent reports. In their 2013 report for example the company states that 'the data are calculated using locally regulated methods where they exist. Where there is no locally regulated method, the data are calculated using the 2009 API Compendium, which is the recognized industry standard under the GHG Protocol Corporate Accounting and Reporting Standard (Royal Dutch Shell, 2013, pg. 36), Interestingly, as in the case of Exxon Mobil, Royal Dutch Shell specifically refer to the problem of reconciling the use of locally regulated calculation methods for GHG emissions with the industry standard. Similar to ExxonMobil, Royal Dutch Shell also state that they have internal standards for reporting. In the 2016 sustainability report, the company outline that "Shell's Health, Safety, Security, Environment and Social Performance (HSSE & SP) Control Framework defines standards and accountabilities at each level of the organization, and sets out the procedures people are required to follow" (Royal Dutch Shell, 2016, p. 20). In recent years Royal Dutch Shell provide assurance for its sustainability report which specifically refers to the fact that a limited level of assurance is provided for direct and indirect GHG emissions calculated on an equity ownership basis. In 2015, the company also provides a reasonable level of assurance for direct and indirect GHG emissions calculated for those facilities where it has operational control. Therefore, especially in more recent years, there is a higher level of confidence around the quality of GHG data reported by Royal Dutch Shell.

The results of this case study give some support to the propositions developed in the first half of the paper. The analysis shows that internal reporting practices do not seem to be the same for global, multi-domestic and transnational MNCs. While the practices were not directly observed, inferences are made from data reported by each company. From the data reported by ExxonMobil, practices are standardized throughout the organization and so are in line with those expected for a global MNC. Data collection processes are also assured by a third party so the resultant data can be deemed of good quality, although it must be noted that the accuracy of the data itself is not assured. For BP, in line with what would be expected for transnational companies, there appears to be more flexibility in terms of carbon management, ultimately resulting in data of largely unknown quality, since it is not clear if GHG data specifically is covered by the assurance process. Furthermore only a limited level of assurance is offered and the inventory does not cover all operations. While Royal Dutch Shell evolved into a global MNC during the period considered, it is also observed that reporting practices have become closer to those of the other global MNC, ExxonMobil. The company refers to internal standard data collection practices, reports on the methodologies used to calculate data and offers assurance of GHG data reported. Given differences in the assurance processes adopted by each of the companies it is difficult to directly compare the quality of reported GHG data – i.e. assurance of processes versus assurance of data. Furthermore, while the overall quality of GHG emissions reporting by the three MNCs is converging; the quality of the emissions data reported by global and transnational companies appears to still diverge quite significantly.

5. Discussion and conclusion

This paper explores the issue of GHG emissions reporting by MNCs. This is an important topic due to the impact that these organizations can have on the global climate change problem. The theoretical framework to explain the quality of GHG emissions reporting is developed by considering how institutional pressures act on different typologies of MNC which in turn impacts internal reporting practices. Linking standardization of practices with the quality of GHG emissions reported, it is found that different typologies of MNC are likely to have different approaches to standardization which ultimately affects reported data quality. The empirical case study gives additional insights and support for the propositions developed.

The case study finds some support for the notion that MNC practices for reporting on climate change conform to the MNC organization strategy. It is observed that global MNCs, ExxonMobil and Royal Dutch Shell, tend to adopt standardized procedures throughout the organization referring to specific methodologies used to calculate GHG data and providing assurance (of varying levels) of GHG data collection processes or of the GHG data reported. In line with the expectation that Global MNCs are less likely influenced by country level institutional pressures, a consistent overall quality of reporting on climate change was observed for ExxonMobil compared to BP. BP on the other hand adopts a more decentralized approach to carbon management, leaving carbon reduction decisions to the discretion of local management. This means that it is potentially also more difficult for the company to standardize reporting practices successfully. This is somewhat evident from the BP sustainability reports in that they do not include all operations within the GHG inventory boundary, do not report on GHG calculation procedures or methodologies and it is also not clear whether (or what percentage of) GHG data specifically is included within the assurance processes. Likewise the assurance provided is at a limited level, while both ExxonMobil and Royal Dutch Shell (in 2015) attempt to provide a reasonable level of assurance. This would indicate that the quality of data reported is overall poorer than that reported by ExxonMobil or Royal Dutch Shell. However, it also must be noted that the overall quality of reporting by these MNCs is below that which is expected when it is compared to the relevant guidelines. Furthermore, differences in the approaches to assurance makes comparison of the quality of reported data difficult.

The findings of this paper provides various insights into MNC reporting practices and the quality of GHG emissions data. Firstly, it provides an alternative explanation of MNC GHG emissions reporting quality than those currently available in the literature. In

addition to perspectives in the literature such as legitimacy theory (Hrasky, 2011), stakeholder theory (Liesen et al., 2015) and institutional pressure at the level of MNC headquarters (Comyns, 2016), this study finds that the internal organization of the MNC (typology) is likely to be an important determinant of GHG emissions reporting. This is useful to explain observed quality problems around why MNCs do not always report on their methodologies to calculate GHG emissions data (Dragomir, 2012) and why they may omit reporting data related to some operations or subsidiaries (Sullivan et al., 2008).

Secondly, from the study it is clear that even though the overall quality of GHG reporting is converging, it is unlikely that the quality of GHG emissions data reported by MNCs has the same trajectory but that fundamental differences are likely to remain which are related to internal organizational structure.

Thirdly, the study also shows that there are problems with GHG emissions quality as reported by MNCs which are difficult to solve using existing guidelines, since the requirements may be inconsistent with MNC internal organizational structure. In this way these findings also add to the literature which highlights shortcomings with current reporting frameworks calling for the need for alternatives such as market orientated disclosure practices (Andrew & Cortese, 2011) or adopting a business model approach based on stakeholder relationships (Haslam et al., 2014).

Finally, this paper also includes insights for policy makers in terms of regulation of climate change reporting. The international business literature finds that greater institutional distance in the regulatory domain means that companies are less likely to adopt standardized practices but will adapt their policies to comply with regulation in local institutional contexts (Aguilera-Caracuel et al., 2013). This means that where regulation is introduced around climate change reporting and where this diverges from regulation around this issue in other geographical contexts, then the less likely that MNCs will standardize practices, a condition necessary for good quality reporting on GHG emissions data. The problem of reconciling local regulatory requirements for GHG calculation with the company standard was raised in the sustainability reports of both ExxonMobil and Royal Dutch Shell. The need for mandatory legislation has been put forward in the climate reporting literature as a means of improving the quality and utility of reports on climate change (Liesen et al., 2015; Lodhia & Martin, 2011), however caution must be exercised. In order to promote good quality reporting coordination between regulators at the national level is required to ensure that legal requirements do not diverge radically. Keeping the institutional distance low in the formal domain is important for good quality GHG emission reporting by MNCs.

This paper offers interesting avenues for future research. Although, this paper provides an initial empirical investigation of the theoretical framework developed further exploration is needed. One of the limitations of the case study presented is that inferences are made about internal reporting practices of MNCs given data reported in sustainability reports. More in-depth observation and analysis of internal reporting practices of MNCs in this context would be useful. Further research may also provide insights into how policy makers can better shape regulation and guidelines to facilitate good quality reporting on GHG emissions by all typologies of MNC.

References

Aerts, W., Cormier, D., & Magnan, M. (2006). Intra-industry imitation in corporate environmental reporting: An international perspective. *Journal of Accounting and Public Policy*, *25*, 299–331.

Aguilera-Caracuel, J., Aragón-Correa, J. A., Hurtado-Torres, N. E., & Rugman, A. M. (2012). The effects of institutional distance and headquarters' financial performance on the generation of environmental standards in multinational companies. *Journal of Business Ethics*, *105*, 461–474.

Aguilera-Caracuel, J., Hurtado-Torres, N. E., Aragón-Correa, J. A., & Rugman, A. M. (2013). Differentiated effects of formal and informal institutional distance between countries on the environmental performance of multinational enterprises. *Journal of Business Research*, *66*, 2657–2665.

Aguilera-Caracuel, J., Fedriani, E. M., & Delgado-Márquez, B. L. (2014). Institutional distance among country influences and environmental performance standardization in multinational enterprises. *Journal of Business Research*, *67*, 2385–2392.

Andrew, J., & Cortese, C. (2011). Accounting for climate change and the self-regulation of carbon disclosures. *Accounting Forum*, *35*, 130–138.

Ang, Z., & Massingham, P. (2007). National culture and the standardization versus adaptation of knowledge management. *Journal of Knowledge Management*, *11*, 5–21.

BP (2004). *Sustainability report 2004*London: BP.

BP (2012). *Sustainability report 2012*London: BP.

BP (2014). *Code of conduct*. Retrieved 12/01/2016, from http://www.bp.com/en/global/corporate/about-bp/people-and-values/code-of-conduct.html.

BP (2015a). *A letter from our group chief executive*. Retrieved 12/01/2016, from http://www.bp.com/en/global/corporate/sustainability/bp-and-sustainability/a-letter-from-our-group-chief-executive.html.

BP (2015b). *Sustainability report 2015*London: BP.

Beddewela, E., & Herzig, C. (2013). Corporate social reporting by MNCs' subsidiaries in Sri Lanka. *Accounting Forum*, *37*, 135–149.

Chatterjee, A. (2012). Assurance of corporate greenhouse gas disclosures in the mining and crude oil production sector: A comparative inter-national Study. *Journal of the Asia Pacific Centre for Environmental Accountability*, *18*, 75–102.

Christmann, P. (2004). Multinational companies and the natural environment: Determinants of global environmental policy. *Academy of Management Journal*, *47*, 747–760.

Cole, M. A., & Elliott, R. J. (2005). FDI and the capital intensity of dirty sectors: A missing piece of the pollution haven puzzle. *Review of Development Economics*, *9*, 530–548.

Comyns, B., & Figge, F. (2015). Greenhouse gas reporting quality in the oil and gas industry: A longitudinal study using the typology of Search, Experience and Credence information. Accounting. *Auditing & Accountability Journal*, *28*, 403–433.

Comyns, B. (2016). Determinants of GHG reporting: An analysis of global oil and gas companies. *Journal of Business Ethics*, *136*, 349–369.

de Aguiar, T. R. S., & Bebbington, J. (2014). Disclosure on climate change: Analysing the UK ETS effects. *Accounting Forum*, *38*, 227–240.

de Villiers, C., & Alexander, D. (2014). The institutionalisation of corporate social responsibility reporting. *The British Accounting Review*, *46*, 198–212.

DiMaggio, P., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, *48*, 147–160.

Dong, S., & Burritt, R. (2010). Cross-sectional benchmarking of social and environmental reporting practice in the Australian oil and gas industry. *Sustainable Development*, *18*, 108.

Dragomir, V. D. (2012). The disclosure of industrial greenhouse gas emissions: A critical assessment of corporate sustainability reports. *Journal of Cleaner Production*, *29–30*, 222–237.

ExxonMobil (2005). *2005 Corporate citizenship report*Texas: ExxonMobil Corporation.

ExxonMobil (2011). *2011 Corporate citizenship report*Texas: ExxonMobil Corporation.

ExxonMobil (2012). *2012 Corporate citizenship report*Texas: ExxonMobil Corporation.

ExxonMobil (2015). *2015 Corporate citizenship report*Texas: ExxonMobil Corporation.

ExxonMobil (2016). *Ethics*. Retrieved 12/01/2016, from http://corporate.exxonmobil.com/en/investors/corporate-governance/ethics/ethics.
Filatotchev, I., & Stahl, G. K. (2015). Towards transnational CSR: Corporate social responsibility approaches and governance solutions for multinational corporations. *Organizational Dynamics*, *44*, 121–129.
Ghoshal, S., & Bartlett, C. A. (1990). The multinational corporation as an interorganizational network. *The Academy of Management Review*, *15*, 603–625.
Global Reporting Initiative (2013). *G4 sustainability reporting guidelines*Amsterdam: GRI.
Grant, R. M., & Cibin, R. (1996). Strategy, structure and market turbulence: the international oil majors: 1970–1991. *Scandinavian Journal of Management*, *12*, 165–188.
Hah, K., & Freeman, S. (2014). Multinational enterprise subsidiaries and their CSR: A conceptual framework of the management of CSR in smaller emerging economies. *Journal of Business Ethics*, *122*, 125–136.
Haigh, M., & Shapiro, M. A. (2011). Carbon reporting: does it matter? *Accounting, Auditing & Accountability Journal*, *25*, 105–125.
Harzing, A.-W. (2000). An empirical analysis and extension of the Bartlett and Ghoshal typology of multinational companies. *Journal of International Business Studies*, 101–120.
Haslam, C., Butlin, J., Andersson, T., Malamatenios, J., & Lehman, G. (2014). Accounting for carbon and reframing disclosure: a business model approach. *Accounting Forum*, *38*, 200–211.
Heede, R. (2014). Tracing anthropogenic carbon dioxide and methane emissions to fossil fuel and cement producers, 1854–2010. *Climatic Change*, *122*, 229–241.
Higgins, C., & Larrinaga, C. (2014). Sustainability Reporting insights from institutional theory. In J. U. Jan Bebbington, & B. O'Dwyer (Eds.), *Sustainability accounting and accountability*. UK & New York: Routledge.
Hoffman, A. J. (1999). Institutional evolution and change: environmentalism and the U.S: chemical industry. *The Academy of Management Journal*, *42*, 351–371.
Hrasky, S. (2011). Carbon footprints and legitimation strategies: symbolism or action? *Accounting, Auditing & Accountability Journal*, *25*, 174–198.
Husted, B. W., & Allen, D. B. (2006). Corporate social responsibility in the multinational enterprise: strategic and institutional approaches. *Journal of International Business Studies*, *37*, 838–849.
IPIECA, & API (2003). *Petroleum industry guidelines for reporting greenhouse gas emissions*London: IPIECA.
IPIECA/API/OGP (2010). *Oil and gas industry guidance on voluntary sustainability reporting*(2nd ed.). London: IPIECA.
IPIECA/API/OGP (2011). *Petroleum industry guidelines for reporting greenhouse gas emissions*(2nd ed.). London: IPIECA.
International Auditing and Assurance Standards Board (2008). *International framework for assurance engagements*. New York, USA: International Federation of Accountants.
Islam, M. A., & Deegan, C. (2010). Media pressures and corporate disclosure of social responsibility performance information: a study of two global clothing and sports retail companies. *Accounting and Business Research*, *40*, 131–148.
Kohut, A., & Pew Research Centre (2013). *Climate change and financial instability seen as top global threats*. Washington, USA: Pew Research Centre.
Köhl, M., Traub, B., & Päivinen, R. (2000). Harmonisation and standardisation in multi-national environmental statistics–mission impossible? *Environmental Monitoring and Assessment*, *63*, 361–380.
KPMG, UNEP, Global Reporting Initiative (GRI), & Unit for Corporate Governance in Africa (2010). *Carrots and Sticks − Promoting transparency and sustainability. An update on trends in voluntary and mandatory approaches to sustainability reporting*. Retrieved 6/02/2017, from http://www.kpmg.com/za/en/issuesandinsights/articlespublications/advisory-publications/pages/carrots-and-sticks-2010.aspx.
KPM, GRI, UNEP, & Centre for Corporate Governance in Africa (2016). *Carrots & Sticks − Global trends in sustainability reporting regulation and policy*. Retrieved 06/02/2017, from https://assets.kpmg.com/content/dam/kpmg/pdf/2016/05/carrots-and-sticks-may-2016.pdf.
Kolk, A. (2010). Trajectories of sustainability reporting by MNCs. *Journal of World Business*, *45*, 367–374.
Kostova, T., & Roth, K. (2002). Adoption of an organizational practice by subsidiaries of multinational corporations: institutional and relational effects. *Academy of Management Journal*, *45*, 215–233.
Kostova, T., & Zaheer, S. (1999). Organizational legitimacy under conditions of complexity: the case of the multinational enterprise. *Academy of Management Review*, *24*, 64–81.
Kostova, T., Roth, K., & Dacin, M. T. (2008). Institutional theory in the study of multinational corporations: a critique and new directions. *Academy of Management Review*, *33*, 994–1006.
Kwee, Z., Van Den Bosch, F. A., & Volberda, H. W. (2011). The influence of top management team's corporate governance orientation on strategic renewal trajectories: a longitudinal analysis of Royal Dutch Shell plc, 1907–2004. *Journal of Management Studies*, *48*, 984–1014.
Liesen, A., Hoepner, A. G., Patten, D. M., & Figge, F. (2015). Does stakeholder pressure influence corporate GHG emissions reporting? Empirical evidence from Europe. *Accounting, Auditing & Accountability Journal*, *28*, 1047–1074.
Lodhia, S., & Martin, N. (2011). Stakeholder responses to the national greenhouse and energy reporting act: an agenda setting perspective. accounting. *Auditing & Accountability Journal*, *25*, 126–145.
Logsdon, J. M., & Wood, D. J. (2005). Global business citizenship and voluntary codes of ethical conduct. *Journal of Business Ethics*, *59*, 55–67.
McKibben, B. (2016). *Donald Trump is betting against all odds on climate change*. Retrieved 27/01/2017, from https://www.washingtonpost.com/opinions/donald-trump-is-betting-against-all-odds-on-climate-change/2016/11/17/8f7bf4ee-acf4-11e6-977a-1030f822fc35_story.html?utm_term=.e2a9529d7d6c.
Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: formal structure as myth and ceremony. *American Journal of Sociology*, *83*, 340.
Morrison, A. J., & Inkpen, A. C. (1991). An analysis of significant contributions to the international business literature. *Journal of International Business Studies*, *22*, 143–153.
O'Dwyer, B. (2005). The construction of a social account: a case study in an overseas aid agency. *Accounting, Organizations and Society*, *30*, 279–296.
Owen, D. L., Chapple, W., & Pinilla Urzola, A. (2009). *Key issues in sustainability assurance*. London: ACCA.
Post, J. E., Preston, L. E., & Sachs, S. (2002). *Redefining the corporation: stakeholder management and organizational wealth*. Stanford University Press.
Prado-Lorenzo, J.-M., Rodríguez-Domínguez, L., Gallego-Álvarez, I., & García-Sánchez, I.-M. (2009). Factors influencing the disclosure of greenhouse gas emissions in companies world-wide. *Management Decision*, *47*, 1133–1157.
Prahalad, C. K., & Doz, Y. L. (1999). *The multinational mission: balancing local demands and global vision*. Free Press.
Rankin, M., Windsor, C., & Wahyuni, D. (2011). An investigation of voluntary corporate greenhouse gas emissions reporting in a market governance system: australian evidence. *Accounting, Auditing & Accountability Journal*, *24*, 1037–1070.
Rosenzweig, P. M., & Singh, J. V. (1991). Organizational environments and the multinational enterprise. *Academy of Management Review*, *16*, 340–361.
Royal Dutch Shell (2013). *Sustainability report 2013*The Hague: Royal Dutch Shell.
Royal Dutch Shell (2016). *Sustainability report 2016*The Hague: Royal Dutch Shell.
Scott, W. R. (2013). *Institutions and organizations*. California: Sage.
Sluyterman, K., & Wubs, B. (2010). Multinationals and the dutch business system: the cases of royal dutch shell and sara lee. *Business History Review*, *84*, 799–822.
Stokes, B., Wike, R., & Carle, J. (2015). *Global concern about climate change, broad support for limiting emissions*. Washington, USA: Pew Research Centre.
Sullivan, R., & Gouldson, A. (2012). Does voluntary carbon reporting meet investors' needs? *Journal of Cleaner Production*, *36*, 60–67.
Sullivan, R., Crossley, R., & Kozak, J. (2008). Corporate greenhouse gas emissions management: the state of play. In R. Sullivan (Ed.), *Corporate responses to climate change: achieving emissions reductions through regulation, self-regulation and economic incentives* (pp. 9–25). Sheffield, UK: Greenleaf Publishing Limited.
UNFCCC (2016). *Intended nationally determined contributions (INDCs)*. Retrieved 27/01/2017, from http://unfccc.int/focus/indc_portal/items/8766.php.
University of Cambridge Institute for Sustainability Leadership (CISL) (2015). *Paris pledge for action*. Retrieved 4/04/2017, from http://www.parispledgeforaction.org/.
Victor, D. G., & House, J. C. (2006). BP's emissions trading system. *Energy Policy*, *34*, 2100–2112.
WBCSD, & WRI (2004). *The greenhouse gas protocol. a corporate accounting and reporting standard*Geneva and Washington D.C: World Business Council for Sustainable Development and World Resources Institute.
Wooten, M., & Hoffman, A. J. (2008). *Organizational fields: past, present and future. the SAGE handbook of organizational institutionalism*. California: SAGE Publications Ltd.
Xu, D., & Shenkar, O. (2002). Note: institutional distance and the multinational enterprise. *Academy of Management Review*, *27*, 608–618.