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The Integration of the Internal Strategic and Operational Controls to Maintain Sustainability Performance: The Linkage of the Sustainability Reporting and Sustainability Performance to Pay Ratio, CEO Power, and the Board Diversity

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by

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Abstract

This dissertation consists of three studies on sustainability performance and the internal strategic and operational components that lead to higher sustainability performance. By applying a systems approach, the first paper demonstrates how the internal strategic and operational components predict sustainability performance and the quality of the sustainability reporting. I find that leading performers (companies with higher sustainability performance) employ systems that are more comprehensive at both the strategic and operational levels. Region of incorporation, business activities, financial variables, and firm size also play a role in achieving sustainability outcomes. Delving into the details of the strategic controls, the second paper investigates the determinants of the pay ratio (between executive managers and non-executive employees) and the influence of the ratio on sustainability performance. I find that the firm's operational performance and the employees' skills are positively associated with the pay ratio, but the higher the ratio between executive and non-executive compensation, the lower the sustainability performance. I conclude that a high relative pay ratio provides a tournament incentive for executives to increase the firm's operational performance. However, the high pay ratio might also lead to non-executive employees' dissatisfaction stemming from the perceived inequity in pay. In addition, high pay ratios are inconsistent with the values of a sustainable company. Rather than investigating compensation for all executives, the third paper narrows the focus to CEO compensation as a proxy for CEO power. Thus, the third paper examines the determinants of CEO power along with compensation committee members' diversity in relation to sustainability performance. I find that CEO power is associated with the executives' demographic structure. After controlling for a firm's ownership structure and internal factors, including financial performance, I determine the short-term and long-term levels of CEO power. I investigate whether CEO power, along with compensation committee members' diversity, is associated with firms' sustainability performance. I find that CEO power (both short term and long term) is significantly associated with sustainability performance. Moreover, I find mostly positive, albeit weak associations between compensation committee members' diversity and sustainability performance.

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Chapter One: Introduction

Sustainability has become a focal point of interest for governments, academics, pension fund managers, corporations, and other institutions. Several well-known multinational corporations (for example, Nike, Apple, and Lehman Brothers) have been forced to defend their questionable operating practices because their stakeholders, including consumers and suppliers, want to ensure that corporate actions are aligned with the firm's financial systems. In the multidimensional world in which we now live, organizations are under pressure to maintain their financial performance while at the same time achieving their sustainability objectives.

In my three dissertation studies, I address sustainability performance, sustainability reporting, and the internal strategic and operational controls that affect sustainability performance. To investigate the effect of internal strategic controls (including board diversity and executive compensation) and operational controls (including environmental management systems (EMSs) and environmental policies) on sustainability performance, I use multiple measures of sustainability performance from various databases, both over a period of time and at a fixed point in time to reduce any measurement bias. I commence the study by investigating the systematic association between internal strategic and operational controls, sustainability performance, and sustainability reporting.

Among the strategic controls, I study if the rating of executive compensation linked to the sustainability performance improves the firms' sustainability performance. Contrary to expectations, I find no significant association between these variables, primarily because of the limited amount of data that is available. Thus, in my second study, I delve further into this issue by applying the actual compensation amounts and exploring the internal determinants of the pay ratio between executive and non-executive employees and the associations between the predicted pay ratio and the sustainability performance. Finally, in the third study, I narrow my

investigation to the relationship between CEO power, which is defined as the proportion of the total compensation of the top five executive managers that is received by the CEO, and sustainability performance. I investigate the determinants of CEO power and the effects of the CEO power and other strategic controls, specifically the diversity of the compensation committee members, on sustainability performance.

Study One

Integrating sustainability into day-to-day operations requires systems thinking that supports organizational behavior aimed at achieving the organization's objectives (Laszlo and Zhexembayeva 2011). Management systems that are designed to promote sustainability must be incorporated into integrated systems that acknowledge the complexity of the world for which they are designed. Following the systems concept suggested by Ackoff (1971), I consider sustainability performance and reporting as the objectives of a concrete, purposeful system whose outcome is enhanced sustainability. This system should act as a resource for a firm that supports both performance and reporting. In line with the resource-based view of the firm, performance and reporting are integral outcomes of the system, although some organizations choose to underemphasize the reporting aspect. However, my premise is that failing to publish a sustainability report closes important channels of information, from both internal and external stakeholders, that can be valuable for decision-making and continuous improvement.

The first study includes a statistical analysis of a large sample of firms across North America and Europe, and thus contributes to the sustainability literature in several ways. First, it provides evidence of the effects of sustainability system components on sustainability outcomes, both at the strategic level and the operational level. At the strategic level, governance and board structure play significant roles, whereas at the operational level, policies, external certification of

the EMS, and assurance of the reporting play significant roles in achieving a higher quality of performance and reporting. Second, by delving further into firm differences based on region, environmental sensitivity, and performance relative to industry peers, the study provides insights into why differences occur among firms. I explain sustainability outcomes based on the development of various sustainability system components, thus providing insight into the inconsistent findings of previous studies. In summary, I provide evidence of the importance of firms using a systems approach consisting of both strategic and operational components to achieve better environmental performance, which is one aspect of sustainability performance, and higher-quality reporting. I find that strategic components integrated with operational systems lead to better environmental performance and a higher quality of sustainability reporting, consistent with the resource-based view. Thus, I recommend a holistic systems approach for firms desiring to maximize their sustainability objectives.

Study Two

While I expected to find a significant association between an executive compensation package that requires the achievement of sustainability objectives and the enhancement of sustainability performance, the results of the first study did not provide support for my hypotheses. As a result of the insufficient number of firms that provided data on executive compensation linked to sustainability objectives, I was unable to establish any significant association when this variable was used as a strategic component in the sustainability management system. Thus, in the next two studies, I used the actual compensation amounts in my analysis and considered the effects of the executive pay ratio, which is the ratio of the executives' pay to that of non-executive employees.

On one hand, the executives' pay packages provide an incentive for better financial performance, although this might be at the cost of the other employees' dissatisfaction and lower sustainability performance. Executive managers might pursue short-term profits at the expense of long-term performance, or take excessive risks that could jeopardize the security and reliability of the organization and non-executive jobs. Thus, the pay ratio between executive and non-executive employees has received considerable coverage in the media and in academic articles (Faleye et al. 2013), as it affects firms' performance. Business advisors point to the link between sustainability performance and employees' monetary incentives in advocating the firm's objectives, other than the traditional financial objectives. Thus, the question arises as to what comprises a fair and effective compensation package, and whether the employees' pay provides sufficient incentive for them to improve the firm's sustainability performance.

The second study addresses the determinants of the pay ratio between executive and non-executive employees and the association between the pay ratio and sustainability performance. Following Faleye et al. (2013) study, the analysis commences with an examination of the determinants of the pay ratio. The main assumption is that the pay ratio is contingent on the bargaining power at the board and executive levels. Firstly, as the board of directors hires the executives, there is a distribution of bargaining power between the top executives, including the CEO, and the board of directors. Moreover, the executives have hiring authority and the power to make decisions about the contractual terms of the non-executive employees. Thus, we need to consider the relative bargaining power of the non-executive employees and the executive managers when they are negotiating their pay packages (Faleye et al. 2013; Shin 2014). These relative bargaining powers are related to the employees' performance and skills, and the

complexity of the firms' activities, and result in a specific pay ratio between the executive and non-executive employees.

Moreover, I study the consequences of a high pay ratio. My study contributes to the literature by not only describing how internal factors, including operating performance and governance, predict the pay ratio, but also investigating the effect of the pay ratio on sustainability performance. The results provide evidence that firstly, operational performance (measured by revenue per employee) and employees' skills (measured by physical capital intensity and R&D intensity) are positively associated with a higher pay ratio (i.e., a greater pay gap). Moreover, the structure of the executive management team, including the female ratio at the executive level and the responsibility of the executives at the board level, is negatively associated with the pay ratio. Larger firms have lower pay ratios (Fox 2009). Secondly, the lower the pay ratio, the higher is the firms' sustainability performance, which suggests that firms pursuing a higher level of sustainability values carry out a wealth distribution process that recognizes all employees' contributions rather than just those of the top executives. Thirdly, the results are robust to the employees' rankings (positions) and the pay period, as I distinguish between the employees' rankings (the CEO and other top executive managers) and the pay period (short-term and long-term pay). I also control for the type of activity of the firms by including a dummy variable for the industry group in my model.

The pay ratio and its effects on the organization's financial structure and operational performance, which are the relevant factors in determining the employees' pay contracts, have been studied at length (Mishel and Davis 2014). Nevertheless, business advisors point to the inevitable link between sustainability performance and employees' pay in relation to firms achieving their environmental and social objectives. In particular, changes in executive pay

levels in comparison with those of non-executive employees has attracted much attention (Cai et al. 2011). High pay ratios raise ethical and economic concerns. Testing the impact of lagged executive pay on sustainability performance, studies have found a negative relationship between CEO pay and sustainability performance (Mahoney and Thorne 2005). To promote employees' concentrated efforts toward sustainability performance, Govindarajulu and Daily (2004) suggest that firms should reward their employees with financial pay, profit sharing, and recognition awards. Combining the results of previous studies (e.g. Mahoney and Thorne (2005) and Govindarajulu and Daily (2004)), I hypothesize that a reduced pay ratio achieved by reducing the executives' pay and/or increasing the non-executive employees' pay) should result in higher sustainability performance. This hypothesis is based on the behavioural agency theories, which imply that higher monetary rewards at the executive level result in non-executive employees shirking their responsibilities and lower sustainability performance (Pepper and Gore 2015).

I also find support for the hypothesis that there is a positive association between the female ratio at the executive level and organizational performance. Based on previous studies, this result might be due to the different risk tolerance and management style of female executives compared with those of their male counterparts (Dezsö and Ross 2012). A higher female ratio reduces the pay ratio, which might be due to the risk aversion of female executives in negotiating their pay in comparison with their male counterparts. However, the presence of more female executives in the top management team is associated with higher sustainability performance, which might be due to the different decision-making style of female executives (Dezsö and Ross 2012). Moreover, as a result of their unique capabilities and characteristics, female executives are considered rare, inimitable resources, providing a high sustainability performance rating for firms (Hill et al. 2015; Adams and Ferreira 2009).

Third Study

Even though I find a significant association between the pay ratio and sustainability performance in my second study, the question arises as to what explains the inequality in pay among top executive managers and how this relates to sustainability performance. Specifically, does CEO power, measured by the CEO's share of all compensation paid to the executives, affect sustainability performance? This question is not answered in the second study. However this is regarded as an important factor that may be associated with sustainability performance. Pay packages should be designed to retain and incentivize talented managers, who provide a high level of service to the company. The CEO has been recognized as the most powerful member of the executive team (Daily and Johnson 1997) and thus should receive the highest share of the pay that is allocated to the executive team. Considering the significance of the CEO function in organizations and the responsibility of the board of directors in appointing the CEO and maintaining the organization's performance, in the third paper, I combine the areas of CEO power and the effect of the diversity of the board's composition and investigate these variables as they relate to sustainability performance. This study contributes to the sustainability literature in the following ways.

First, the results of the study indicate that both diversity of the compensation committee and CEO power affect sustainability performance. While previous studies provide inconclusive evidence of the effect of board diversity on CEO power, I propose that the CEO's short-term (long-term) power, measured by the CEO's share of the executive team's aggregate current (equity based) compensation, has a negative (positive) effect on the firm's sustainability performance. Thus, the importance of the executives' compensation packages and the short-term pay arrangements (salary and bonuses) and long-term incentives (equity shares) are studied

separately. I determine that the internal executive structure, the executives' abilities, and the firm's performance are associated with the CEO's power. Then, I study the effect of CEO power, along with compensation committee diversity, on sustainability performance. By introducing multiple proxies for the diversity of the members of the compensation committee, I find a significant positive (negative) association between the CEO's long-term (short-term) power and sustainability performance. However, the diversity in any one dimension is not found to have a direct effect on CEO power. Second, by measuring the compensation committee diversity and controlling for the firm's ownership structure, I find that short-term CEO power mostly has a positive association with the CEO's age, while there is a negative association between CEO duality, executive dependency, and the female ratio at the executive level. This means that the more executives, including CEOs, who serve on the board, the lower is the CEO's short-term power. Moreover, among the executives' structural variables, only the CEO's age has a significant positive association with the CEO's long-term power.

Third, I define six components of the diversity of compensation committee members and create several diversity indices. While not all of the diversity indices have a significant effect on sustainability performance or CEO power, the combined group of indices, along with CEO power, has a significant effect on sustainability performance. Short-term (long-term) CEO power has a significant positive (negative) association with sustainability performance. The assumption is that the compensation committee members decide on the executives' compensation (with final approval from the board of directors), which is determined by the executive structure (age, gender, skills, and performance) and the firm's financial performance and complexities (revenue per employee, R&D intensity, physical capital intensity). The relationship between the executives' compensation and the executives' structure is determined after controlling for the

firm's ownership structure (percentage of institutional owners versus insider owners), financial performance (current ratio, ratio of liabilities to total assets, and the book to market value of the firm), and firm structure (firm size and board size).

The remaining sections of the dissertation are organized as follows. Chapter Two presents a systematic approach to the association between strategic and operational controls that leads to higher sustainability performance and sustainability reporting quality (Study One). Chapter Three presents a study of the effect of the pay ratio between executive and non-executive employees (considering determinants and consequences) on sustainability performance (Study Two). Chapter Four (Study Three) extends the second paper's line of research and investigates the association between CEO power, measured by the CEO's share of the total executive pay, and the executive structure and sustainability performance. Finally, Chapter Five summarizes all three studies and discusses their theoretical and practical impact on the sustainability field.

Chapter Two: Study One

Enabling sustainability system components and sustainability outcomes

Abstract

Scholars have given considerable attention to investigating the role of isolated components designed to achieve sustainability outcomes. However, there is a dearth of research examining these components in an integrated system. Because our planet consists of numerous interdependent relationships, when organizations attempt to maintain or improve these relationships their systems must parallel the complexity of the target phenomenon. Therefore, I investigate both the strategic and operational components that comprise an organization's sustainability management system, which is designed to achieve the organization's sustainability objectives. The statistical analysis was conducted using a large sample of international companies, and it was found that leading performers employ systems that are more comprehensive at both the strategic and operational levels. Region of incorporation, business activities, financial variables, and size also play a role in achieving sustainability outcomes.

Section 1: Introduction

Our planet is a biosphere with complex, interdependent relationships between the land, sea, water, air, and flora and fauna that inhabit its domains. We live in an intricate, sophisticated system with a multitude of diverse interactions. Therefore, when organizations attempt to maintain this delicate balance by achieving their sustainability objectives, they must recognize the holistic nature of our biosphere and subsequently pattern their systems holistically. A one-dimensional perspective is inappropriate when operating in a multi-dimensional context.

Integrating sustainability into day-to-day operations requires systems thinking that supports organizational behavior towards achieving objectives (Laszlo and Zhexembayeva 2011). Management systems designed for sustainability must be structured and integrated so that they acknowledge the complexity of the world for which they are designed. Following the systems concept suggested by Ackoff (1971), I consider sustainability performance and reporting as the objectives of a concrete, purposeful system whose outcome is enhanced sustainability, which includes not only improvement in sustainability performance, but also in reporting. Reporting is an integral element of the system's outcomes that some organizations choose to underemphasize. However, my premise is that failing to publish a sustainability report closes important channels of information, from both internal and external stakeholders, that can be valuable for decision-making and continuous improvement.

Furthermore, performance and reporting utilize some complementary characteristics. Through stakeholder engagement, the organization can use the report as a vehicle for appreciating contrasting beliefs and recognizing the complexity of various issues. The report can also be used as a means to elicit different stakeholders' impressions of the organization's performance (Herremans et al. 2016). Without the reporting process, the organization has no way

of determining whether it is meeting stakeholder demands and expectations. Just as the annual financial report provides critical information for both shareholders and management, the sustainability report provides critical information for both stakeholders and management.

To achieve the interdependent objectives of quality performance that are linked to quality reporting, sustainability system components must support these objectives at both the strategic and operational levels. The strategic level provides direction, and the operational level facilitates the implementation of activity in that direction. At the strategic level, I follow Walls et al. (2012), who take a holistic approach to corporate governance in the three domains of ownership, board, and management levels and recognize the interactions among these three domains that affect environmental performance. However, while recognizing the importance of corporate governance, my approach studies the connectivity of the characteristics at the strategic board level to the characteristics at the operational management level. This approach addresses the need to use more holistic models, which entrench strategic governance factors with operational behaviors, when investigating sustainability (Filatotchev and Nakajima 2014).

At the strategic level, the appropriate structure and composition of the board can create conduits through which different viewpoints and opinions can be assimilated. Once a strategic direction is determined through multi-stakeholder input, the operational system must be sufficiently mechanistic in its structure and detail to ensure that it is functioning suitably to implement the strategic direction. The operational system informs decision-making that capitalizes on opportunities, aids in resource allocation, provides direction on sustainability initiatives, and monitors progress. It implements organizational policy through specific procedures, practices, and methods.

If they are in harmony, the components of the sustainability system will produce a higher level of sustainability performance and a higher-quality sustainability report. A unique feature of this study is that I investigate the interconnectivity between performance and reporting using a systems approach, assuming that reporting is not only an outcome of performance, but also provides information that is useful in improving performance.

Even though institutional theory would suggest that all organizations facing similar types of pressures will respond to sustainability matters in a similar manner, in reality there is a range of performance levels between leaders and laggards, even within the same industry, as evidenced by academic research (Walls and Berrone in press) and the numerous ratings agencies that score organizations on both their sustainability performance and their reporting, such as Corporate Knights, Carbon Disclosure Project (CDP), MSCI, and the Dow Jones Sustainability Index. My aim in using a systematic approach to sustainability is to understand how some organizations have moved ahead of the pack, whereas others have barely begun to provide even a minimum level of information on their website regarding initiatives, let alone using other reporting channels (Herremans et al. 2009).

This study includes a statistical analysis of a large sample of firms across North America and Europe, and thus contributes to the sustainability literature in several ways. First, I provide evidence of the effects of sustainability system components on sustainability outcomes, both at the strategic level and the operational level. At the strategic level, governance and board structure play significant roles, whereas at the operational level, policies, external certification of the environmental management system (EMS), and sustainability reporting assurance play significant roles in achieving a higher quality of sustainability performance and reporting. Second, I provide insight into why differences occur among firms. By delving further into firms'

differences based on region, environmental sensitivity, and sustainability performance relative to industry peers, I explain sustainability outcomes based on the development of their sustainability system components. Thus, my study provides insight into inconsistent findings from previous studies.

This study is organized into four sections. First, I review the studies in the related sustainability literature. Considering the gaps in the literature, I develop my research questions and hypotheses. Next, I explain the research methodology. Finally, I summarize and discuss the findings, and present conclusions.

Section 2: Theoretical framework and hypothesis development

A systematic approach to addressing sustainability issues requires a broad constellation of strategic and operational organizational functions (Russo and Fouts 1997). Such systems comprise detailed procedures, practices, and methods that are structured to enable organizational activities to be targeted toward sustainability outcomes. If the sustainability system is working efficiently and effectively, its various components should interact and complement one another. According to Russo and Fouts (1997), how the system elements act in harmony to create a competitive advantage can be explained under the general umbrella of the resource-based view (RBV).

Based on the diverse perspectives that mirror an organization's stakeholders, resources must be developed to implement the strategy. The relationship between the board at the strategic level and management at the operational level is critical for good sustainability performance (Walls et al. 2012). The natural-resource-based view of the firm, which is an extension of the RBV, suggests that differences in implementing organizational strategy are the result of the development of unique internal resources (Barney 1991; Rugman and Verbeke

2002; Teece 1986; Wernerfelt 1984). Variations in performance depend on firms' ability to obtain or develop resources at different stages of the sustainability system (Herremans et al. 2009; Grunig and Hunt 1984; Morsing and Schultz 2006; Bowen et al. 2010; Pedersen and Gwozdz 2014; Hart 1995). Buysse and Verbeke (2003) suggest that five resource domains are necessary to implement environmental strategy: investments in conventional green competencies, employee skills, organizational competencies (formal, routine based), management systems and procedures, and strategic planning processes. Although resources might exist in isolated pockets within the firm, they need to be molded into a system that starts with planning for improved performance and ends with reporting on the performance to various stakeholders, both internal and external, to form the basis for the following year's plans.

At the strategic level, responsibility for controlling organizational affairs in a way that is fair to all stakeholders is becoming a part of the purview of corporate governance (Rossouw 2005). As the board of directors is instrumental in setting the strategic direction of the organization, its structure and composition should reflect diverse membership, different points of views, and channels for information flow to safeguard against myopic thought. The values, experiences, and capabilities of the board members determine whether the organization's definition of sustainability will be broad or narrow, and the board members monitor how the definition is reflected in corporate actions (MacMillan et al. 2004; Huang 2010).

The characteristics of the board structure can help or hinder the sustainability system at the strategic level and lead to various sustainability performance levels. Some of the strategic characteristics include dual responsibilities (the CEO and board chair are the same person) (David et al. 2005), the percentage of inside and outside directors, and separate board

committees (Clarkson et al. 2008b). Furthermore, Harjoto et al. (2015) illustrate a positive relationship between gender diversity at the board level and sustainability performance. Finally, Ulrich (2013) argues that rewarding and motivating management for behaviors consistent with the organization's sustainability values can enhance performance. The literature also provides support for the means by which corporations can open channels of information flow at the strategic level, and thus improve reporting outcomes through independent directors (Clarkson et al. 2008b; Chen and Jaggi 2000; Forker 1992; Haniffa and Cooke 2005), the existence of a special committee to address sustainability (Nazari et al. 2015; Ho and Shun Wong 2001), and separation of ownership and control (Kassinis and Vafeas 2002; Ortiz-de-Mandojana et al. 2014).

At the operational level, similar to a managerial control system, an EMS is designed to implement the board's policies and strategic objectives. The reason for developing ISO 14001 was to institutionalize a systematic approach toward sustainability (Russo and Fouts 1997). ISO14001 (2004)defines an EMS as part of an overall management system that includes the organizational structure, planning activities, responsibilities, practices, procedures, processes, developing resources, and implementing, achieving, reviewing, and maintaining the environmental policy. The Canadian Institute of Chartered Accountants (2006) simplifies the definition into four elements that are found in any managerial control system: purpose, commitment, capability, and learning. Purpose refers to the policy and planning activities in the ISO definition. Commitment and capability to achieve the purpose come from rewarding what is important, and providing training, budgetary support, and access to information sources. Learning is achieved through an audit process and following up on the audit recommendations.

To test my hypotheses related to sustainability systems, I use a holistic approach (Filatotchev and Nakajima 2014; Walls et al. 2012) that allows for the investigation of the interconnection between five characteristics of the board for setting the strategic direction and four characteristics of operational implementation as they relate to both sustainability performance and reporting, and provide insight into how these factors work together in a system. To summarize the hypotheses, I present my systematic approach in Figure 1. This figure demonstrates that there are direct relationships among the strategic and operational components in the system, which will support better sustainability performance and in turn positively affect the quality of sustainability reporting.

Sustainability is defined as the interconnection of the economic, environmental, and social dimensions. It is often depicted as a set of Venn diagrams with sustainability represented by the area where the three circles overlap, which suggests that activities that are truly sustainable reflect all three dimensions. In regard to defining and measuring performance in these three dimensions, in reality organizations are more advanced in terms of the economic and environmental dimensions compared with the social dimension. Therefore, I have attempted to narrow my variables of interest to the environmental dimension. Whenever it is not possible to do so, mostly at the strategic level, I refer to the component in my system as a sustainability variable[1]. When it is possible to separate the environmental dimension from the other dimensions, I refer to the variables as environmental variables. Each of my research hypotheses is discussed below.

Insert Figure 2.1 about here

[1] For example, most organizations do not have separate board-level committees for the environmental and social dimensions, but rather use one committee to address both.

Strategic system components: board structure and composition

Assigning responsibility for sustainability to a separate board committee can be effective in ensuring better performance and a higher quality of disclosure (Nazari et al. 2015) by creating a commitment to stakeholders (Amran et al. 2014). Using a large sample of Australian companies, Klettner et al. (2014) found that the existence of a committee at the board level that is responsible for sustainability issues helps companies to consider the stakeholders' interests, monitor progress toward better performance, and be more transparent in reporting. I therefore hypothesize the following:

H1 (a): The existence of a board-level committee for sustainability performance is positively associated with better environmental performance.

Because the board's compensation committee recommends the variables to be included in the compensation scheme, I test whether executive compensation linked to the sustainability objectives motivates executives to pursue better performance and reporting. The structure of the executives' compensation package could provide an incentive for managers to improve their performance (Mahoney and Thorn 2006). Numerous previous studies have examined overall executive management compensation and sustainability performance but have not investigated the specific elements of compensation that are geared toward sustainability performance (Berrone and Gomez-Mejia 2009). Thus, this aspect of compensation and its link to performance is understudied. Therefore, I hypothesize the following:

H1 (b): Compensation that is linked to sustainability performance is positively associated with better environmental performance.

I also test the relationship between the demographic diversity of the board of directors and environmental performance, as diversity has been found to be an important variable in

previous studies (Hafsi and Turgut 2013; Michelon et al. 2013; Mallin et al. 2013; Boulouta 2013). Bruna et al. (2014) found a significant correlation between gender diversity at the board level and higher transparency. Jamali and El Dirani (2014) argued that board diversity affects the work context and can improve employee satisfaction, helping the organization to go beyond what is mandated by law. Consistent with the arguments in the literature, I hypothesize the following:

H1 (c): The greater the board's gender diversity, the better will be the environmental performance.

The percentage of independent board members and the separation of duties of the CEO and the chair of the board are the other two components that are generally recognized by securities commissions and stock exchanges as representative of higher standards of corporate governance (Khan et al. 2013; Mishra and Mohanty 2014). Thus, I test for the significance of these board characteristics that can directly affect environmental performance and indirectly lead to higher reporting quality. Therefore, I hypothesize the following:

H1 (d): Separation of the duties of the CEO and the board chair is positively associated with better environmental performance.

H1 (e): The more independent members of the board there are, the better will be the environmental performance.

Operational system components

At the operational level, there are several components of a sustainability system that have been recognized as being helpful in the process of achieving good environmental performance. However, they have not been studied as an interconnected system, but rather as

isolated components. These components are the policy, the EMS, external certification of the EMS, and external verification of the sustainability report.

Formal Policy and the EMS: Although having a policy does not necessarily mean that it will be implemented to the fullest extent, writing a rigorous policy that covers all phases of the company's environmental impacts is the first step to improving performance and its associated disclosure. Corporate practices, such as auditing the policy statement, can help to ensure that the policy is fully executed. However, Ramus and Steger (2000) found that simply having an environmental policy can lead to positive employee behavior regarding environmental activities. In another study, Ramus and Montiel (2005) found that the degree of policy implementation depends on the types of business activities and the economic incentives/disincentives for environmental change. Manufacturing and extractive industries were more likely to fully implement their policies.

The sustainability policy, which is generally approved by the board of directors, sets parameters and provides directions for action by operational units. The policy is then implemented with the support of an EMS. Environmental policies, including high-level policies such as the United Nations Global Compact, have been studied in different contexts (Berliner and Prakash 2014), and it has been found that they are a significant component of an environmental system (Kell and Levin 2003). However, policies can display various degrees of comprehensiveness and usefulness in providing direction for environmental performance. I therefore hypothesize the following:

H2 (a): The more rigorous the sustainability policy, the better will be the environmental performance.

The broadness/narrowness of the organization's environmental policy is reflected in the EMS, and in turn performance. A well-developed EMS generally follows an externally developed

standard and includes detailed environmental targets and transparent deadlines to reach these targets (Clarkson et al. 2008b; Klassen and McLaughlin 1996). An EMS can also be a reliable measure of innovation, which can motivate improvement in environmental performance (Aravind et al. 2014).

Klassen and McLaughlin (1996) found that an EMS is an essential control mechanism for achieving environmental performance goals. By investigating the role of positive environmental events, such as awards for performance and positive management attitudes toward the environment, they found abnormal positive stock returns (an indication of the importance of the EMS) associated with strong environmental performance. Morrow and Rondinelli (2002) found that companies adopt an EMS to find cost-cutting opportunities, develop a competitive advantage, motivate employees, and improve environmental performance. Melnyk et al. (2003) used a questionnaire to collect data on managers' attitudes toward an EMS, specifically ISO 14001, and found strong support for a strategic direction provided by the board of directors in relation to corporate social responsibility and performance (Klassen and McLaughlin 1996). Darnall and Edwards (2006) suggested that an EMS requires organizations to engage employees, review operations, and monitor progress. These processes help the organization to comply with the relevant regulations and avoid pollution and waste. Because an EMS relies on knowledge-based skills, it can lead to the development of capabilities such as the application of advanced technologies like life-cycle assessment and value-chain analysis (Fiksel 1993). Therefore, I hypothesize the following:

H2 (b): The more sophisticated the EMS, the better will be the environmental performance.

Certification of the EMS: ISO 14001 calls for the certification of the EMS (Morrow and Rondinelli 2002). Keeping in mind that not all EMSs are certified, Ramus and Montiel (2005), in their

study of the implementation of environmental policies, suggested that third-party audits and verification may be necessary to ensure the implementation of an organization's policy. They concluded that in the absence of regulations or a business case, the organization is not likely to fully implement the policy. Therefore, another necessary element supporting policy implementation is external certification of the EMS. Thus, I include external certification of the EMS as a component of the internal operational system, and hypothesize the following:

H2 (c): External certification of the EMS according to ISO 14001 standards is associated with better environmental performance.

External assurance of sustainability reports: In addition to policies and EMS certification, the need for assurance through some level of audit or review is increasingly reflected in sustainability reporting standards. According to the International Auditing and Assurance Standards Board (IAASB), "assurance engagement means an engagement in which a practitioner expresses a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the outcome of the evaluation or measurement of a subject matter against criteria" (IAASB 2006, , p. 283).

An increasing number of organizations are seeking external assurance on their sustainability reports (Kolk and Perego 2010). Peters and Romi (2015) found that sustainability-oriented strategic directions will have an impact on the assurance of corporate sustainability reports. Illustrating the interconnectedness of the strategic and operational systems components, they found that having a board committee with sustainability expertise will increase the likelihood of assurance of sustainability reports. Using a sample of international companies drawn from 26 countries, Clarkson et al. (2015b) found that sustainability reporting with external assurance is positively associated with stronger sustainability performance. Thus, I hypothesize:

H2 (d): The existence of an external audit of the sustainability report will positively affect environmental performance.

Sustainability system outcomes: performance and reporting

Al-Tuwaijri et al. (2004b) suggested that the corporate decision regarding the choice of a sustainability strategy determined the quality of sustainability disclosure. Thus, these decisions are regarded as endogenous and a function of the quality of sustainability management. The underling concept is that managers with a broad definition of accountability would ensure that performance leads to holistic sustainability reporting. Some of the previous studies reported a negative association between environmental performance and the quality of the sustainability reporting (Bewley and Li 2000; Freedman and Wasley 1990) or a non-significant association between environmental disclosure and the related performance (Hughes et al. 2001), which the researchers recognized as resulting from the increase in the disclosure requirements by the FASB and the SEC for poor-performing firms. However, by undertaking content analysis of non-discretionary environmental disclosure using Toxic Release Inventory data, Al-Tuwaijri et al. (2004a) reported a positive association between environmental performance and environmental disclosure. Patten (2002) identified a lack of sufficient control factors, inadequate sample selection, and measurement issues as the main reasons for inconsistency in the studies. Clarkson et al. (2008b) found that good environmental performers disclosed more information than poor performers. These studies are consistent with the economists' view that firms assess the costs and benefits of the disclosure decision and aim to proactively project a reputation of sustainability. The reports prepared at the most comprehensive level, i.e. the Global Reporting Initiative (GRI), require stakeholders to determine the materiality of various environmental aspects. Therefore, open communication with stakeholders suggests the company has an

opportunity to learn from its stakeholders and concentrate performance and reporting on those aspects of greatest concern. Therefore, sustainability performance should complement the disclosure. In other words, firms with better performance would have better disclosure in their sustainability reports. In my proposed systems approach, the strategic and operational characteristics will predict sustainability performance in the first stage. In the second stage, the expected sustainability performance will predict the reporting quality. Thus, the strategic decision regarding the type of sustainability performer the firm will be is linked to reporting quality. Therefore, I hypothesize the following:

H3: The better the environmental performance predicted by the strategic- and operational-level components, the better will be the quality of the sustainability reporting.

Section 3: Methodology

I narrowed the area of study to the environmental dimension of sustainability and adopted a systems approach to model the relationships among the strategic and operational components and the interdependent outcomes of performance and reporting quality. My model accounts for the endogeneity between performance and reporting.

Model

To test these relationships, I use a two-stage least squares (2SLS) estimation model. In the first stage, performance is the dependent variable, and strategic and operational components are the independent variables. In the second stage, the reporting quality is regressed on the residuals, which are predicted in the first stage.

Defining the X matrix as a representation of strategic and operational components, we test the following model:

<u>Equation 1:</u>

$$Performance_i = X_i + ROA_i + Size_i$$

$$+ Newness_i + Current\ Ratio_i + EnvSens_i + Region_i + v_i$$

<u>Equation 2:</u>

$$Sustainability\ Report\ Quality_i = Performance_i^* + ROA_i + Size_i +$$

$$Newness_i + Current\ Ratio_i + EnvSens_i + Region_i + u_i,$$

where $Performance_i^*$ is the predicted performance from Equation 1 and

$$X_i = \begin{bmatrix} Board\ Sus\ Committee_i \\ Exe\ Sus\ Comp_i \\ Board\ Diversity_i \\ CEO/Chair\ Separation_i \\ Board\ Independence_i \\ Policy_i \\ EMS_i \\ EMS\ Certification_i \\ Report\ Assurance_i \end{bmatrix}.$$

Sample and data collection

Sustainability data were collected from the Sustainalytics database and financial data were collected from the S&P Capital IQ database. Sustainalytics has several advantages over other social rating databases that are frequently used in academic research (Surroca et al. 2010), and is rated as more credible than other sustainability rating databases (GlobeScan/SustainAbility, 2012). Sustainalytics is a global leader in providing sustainability databases for research and analysis. The rating system contains 60–100 indicators that can be used as components of a sustainability system. Rather than using a simple 1,0 rating, as in the MSCI ESG (formerly KLD) database to indicate the existence of an social, environmental, and governance (ESG) concern or strength, Sustainalytics provides up to five different levels of performance for each component, offering a finer-grained description of the degree to which each component exists in a specific firm. This method of rating provides a greater degree of specificity regarding the extent of a

firm's systems components, environmental performance, and reporting quality (Bleher et al. 2013). Sustainalytics uses six different weight combinations for 38 peer industry groups, with the total weight being multiplied by the total score of each category of ESG to calculate the overall sustainability rating (Bleher et al. 2013). However, for this research I use unweighted data, as weightings can distort the data and provide bias either in favor of or against a particular firm or industry depending on the raters' subjective judgments.

Insert Table 2.1 about here

I use only observations with complete data on variables of interest, which is the most conservative method for control of missing data (Cox et al. 2014). Consequently, the sample size is 4,370 firm/year observations: 1,483 firms in 2009; 1,578 firms in 2010; and 1,309 firms in 2011 (see Table 1). Considering the stability of the dependent variables over the three years, I use the pooled data in the endogenous model, which will be discussed in detail in the next section.

Given the much larger sample size compared with previous studies, I am able to segment my data and differentiate firms on the basis of their region, environmental sensitivity of the industry, and performance of the firm compared with the industry average. To conduct further analysis, I separate the firms into four regions, North America, Europe, Asia-Pacific, and Latin America representing 44, 34, 22, and 0.10 percent of the sample, respectively. However, given that North America and Europe comprise a major component of my sample (78 percent), I only conduct my comparative analysis on these two segments. Furthermore, based on Standard Industrial Classification (SIC) codes[2], I separate the sample into two industry groups, non-

[2] Environmentally Sensitive: Energy, Materials, Utilities, and Chemicals
Non-environmentally Sensitive: Automobiles and Components, Banks, Capital Goods, Commercial and Professional Services, Consumer Durables and Apparel, Consumer Services, Diversified Financials, Food and Staples Retailing, Food, Beverage and Tobacco, Healthcare Equipment and Services, Household and Personal Products, Insurance,

environmentally sensitive and environmentally sensitive, representing 72 and 28 percent of the sample, respectively. To provide a more rigorous analysis, I also consider the firm's environmental performance by comparing it with the average industry group performance, using a dummy variable (1,0) for above- or below-average industry performance, respectively. This process resulted in 45 (55) percent of firms being above (below) the industry average.

Variable measurement and definitions

Dependent variables (performance and reporting quality)

Many sustainability rating organizations combine sustainability systems indicators in an overall ESG score. However, these three dimensions are dissimilar, and some of the so-called indicators are only proxies for actual performance. Therefore, I only use indicator scores for data on actual environmental sustainability, which is the average of the firms' ratings on operations, contractors and the supply chain, and products and services.

I follow several other researchers (Clarkson et al. 2008b; Clarkson et al. 2011; Guidry and Patten 2010) in using GRI levels as an indicator of reporting quality. The GRI is the acknowledged leader in the development of sustainability reporting guidelines (del Mar Alonso-Almeida et al. 2014). More than 4,000 organizations from 60 countries use version 3 of the GRI guidelines to report on their economic, environmental, and social performance. GRI reporting is assessed at three levels, A, B, or C (highest to lowest). An A-level report is more comprehensive, covering more topics than a C-level report.

The scoring methodologies (scores between 0 and 100) for the two dependent variables are shown in panel A of Figure 1.

Insert Figure 2.1 Panel A about here

Media, Real Estate, Retailing, Semiconductors and Semiconductor Equipment, Software and Services, Technology Hardware and Equipment, Telecommunication Services, Transportation

Independent variables (strategic and operational components)

The independent variables representing strategic and operational components are ordered scores (100, 75, 50, 25, or 0, highest to lowest). The scoring is nominal, which means that the different states are ordered in a meaningful sequence, but the intervals between the scores may be uneven. The lack of equal distances between the orders means that arithmetic operations are not possible; however, logical operations can be performed on the data.

Strategic components: I test five strategic components that previous sustainability studies have found to have an effect on sustainability performance (Amit and Schoemaker 1993). 'Sustainability committee' indicates the level of authority (board members or management) that is responsible for sustainability direction. 'Executive compensation' indicates whether a part of the executives' remuneration is explicitly linked to sustainability performance targets, such as health and safety targets or environmental targets. 'Board diversity' denotes the number of women on boards. In the case of two-tiered structures, the composition of the executive board, as well as the supervisory board, is considered. 'Chair/CEO separation' indicates whether two different people hold these positions. Finally, 'board independence' indicates the independence of supervisory board members in cases of two-tiered boards or the independence of board members in cases of single-tier boards. The details of the scoring system (scores between 0 and 100) are shown in Panel B of Figure 2.1.

Insert Figure 2.1 Panel B about here

Operational components: I apply four operational components that are associated with environmental performance. 'Policy' indicates the comprehensiveness of the environmental policy. 'EMS' represents the quality and comprehensiveness of the EMS. 'EMS certified' clarifies the extent of the activities receiving external certification (i.e. in accordance with ISO

14001). ‘Report assurance’ indicates the existence of an external review of the sustainability report in accordance with an assurance standard. The details of the scoring system (scores between 0 and 100) are shown in Panel C of Figure 1.

Insert Figure 2.1 Panel C about here

Differentiating variables

The variables ‘region,’ ‘industry group,’ and ‘performance’ are used to investigate whether better performance and reporting can be differentiated based on the degree of completeness of the systems according to the region where the firm’s headquarters is located, the environmental sensitivity of the industry group, and the firm’s performance relative to the industry average.

Region: External factors, such as institutional pressure, culture, and government regulations, can differ depending on the firm’s region or country of origin (Williams and Aguilera 2008; Campbell 2007). Therefore, I code for the region based on the location of the firms’ headquarters: North America or Europe.

Environmental Sensitivity: Firms’ expectations and attitudes toward performance and reporting can vary as a result of the unique characteristics of various industries (Williams and Aguilera 2008; Bansal and Roth 2000; Strike et al. 2006). In addition, the environmental impact is greater in resource-extraction industries compared with non-resource-extraction industries (De Franco et al. 2012; Herremans et al. 2009). Therefore, I categorize the firms into two groups based on their SIC codes, environmentally sensitive (extractive) and non-environmentally sensitive (non-extractive).

Leaders and Laggards: Given that classifying industries into just two categories might tend to obscure other important industry characteristics, I further compare each firm’s

performance with the mean performance of its own industry using a dummy variable coded as zero (one) if the firm's environmental performance is below (above) the mean performance of the industry group and label the group thus created as laggards (leaders).

Control Variables

Although this is not the main focus of my analysis, several variables such as financial status, size, and newness of plant and equipment provide insights into sustainability performance and reporting. Therefore, consistent with the extant literature, I have controlled for these variables in the model (Jayachandran et al. 2013).

Return on Assets and Current Ratio: Implementing sustainability performance initiatives generally requires the firm to be financially stable (Haniffa and Cooke 2005; Hossain and Hammami 2009). However, it is unclear whether profits or liquidity would be a better predictor of environmental performance, as studies are inconclusive. Accruals-based profits do not always provide the necessary cash to invest in environmental initiatives. Therefore, I include both the return on assets (ROA) and the current ratio in my model.

Size and Newness: Size is a significant variable in explaining sustainability performance and reporting quality (Perrini et al. 2007). Using the classic measurement of size (the natural logarithm of the total assets), I control for firm size in my systems model. I also control for the newness of plant and equipment by dividing net property, plant, and equipment by gross property, plant, and equipment (Clarkson et al. 2008a). Those firms with newer plant and equipment sometimes show a greater capacity for improved environmental performance.

Section 4: Results

Independent samples t-test and descriptive statistics

An independent samples t-test is conducted to compare the sample data with those of the Sustainalytics database (before deleting missing data) to ensure that the sample is representative. The results indicate that there are no significant differences in the environmental performance and reporting scores, the strategic and operational components, or the control variables (unreported statistics) between the sample and the overall population. For the dependent variables, environmental performance scores range from 20.29 to 90.77 (mean (M)=52.75; standard deviation (SD)=10.85) and report quality scores range from 0.00 to 100.00 (M=21.82; SD=31.40). Comparing performance and reporting, firms have made some progress in terms of environmental performance, but there is considerable room for improvement in reporting. The SD scores show more variance in relation to reporting than performance, but there is considerable variance among firms in both areas. The M, SD, and minimum and maximum values for the independent variables of strategic and operational components and the control variables are shown in Table 2.2.

The independent samples t-test results indicate that the environmental performances for each of the differentiating variables for region (Europe vs. North America), industry group (environmentally sensitive vs. non-environmentally sensitive), and performance (leaders vs. laggards) are significantly different. This result suggests that these differentiating variables require further analysis (details discussed later).

Insert Table 2.2 about here

Correlation analysis

The risk of collinearity or endogeneity in my model is not high, as there are low or moderate correlations between the operational and strategic independent variables. The Pearson correlation coefficients are illustrated in table 2.3.

Reporting quality and external assurance of the reporting have a correlation coefficient of 0.41 (p=0.00). Operational system variables have higher correlations with both environmental performance and reporting than strategic system variables, the highest being 0.66 (p=0.00) between performance and EMS. When investigating the correlations among independent variables, the coefficients are generally low except for that between EMS and EMS certification, which has the highest correlation coefficient of 0.69 (p=0.00).

Insert Table 2.3 about here

Hypotheses testing results

The results of the first stage of the two-stage model indicate that the model is well specified (F(59,4310) of 268.82, p=0.00). Overall, the R^2 of 79 percent indicates that strategic and operational systems components explain a good share of the variability in performance after controlling for financial variables (ROA, newness, and current ratio), size, region, and industry.

Insert Table 2.4 Step 1 about here

At the strategic level, the existence of a sustainability committee (β=0.01, p=0.008) and board diversity (β=0.01, p=0.001) have significant positive effects on performance (H1: a, c). Separation of the chair and the CEO has a weak positive effect (β=0.003, p=0.06) on performance (H1: d). Regarding the other variables, executive compensation linked to sustainability and board independence (H1: b, e) do not have significant impacts on environmental performance at this stage of the analysis.

I find that all of the operational components of the sustainability system including policy (β=0.03, p=0.00), the EMS (β=0.03, p=0.00), external certification of the EMS (β=0.02, p=0.00), and sustainability report assurance (β=0.03, p=0.00) significantly and positively predict environmental performance (supporting H2: a, b, c, and d). The only control variable that has a marginally positive effect on environmental performance is firm size (β=0.10, p=0.06).

Insert Table 2.4 Step 2 about here

Overall, the Wald test in the second stage (Equation 2) indicates that the model is well specified (Chi2 (51)=653.62, p=0.00). The results of the second stage provide support for H3. As predicted, environmental performance is positively and significantly associated with sustainability reporting quality. Contrary to the results of the first stage, firm size negatively affects sustainability reporting quality.

Overall, the results support the need for a firm to take a systems approach to improving their environmental performance and reporting. Haphazard or isolated components result in mediocre or low performance. Additionally, many firms with low-quality performance do not produce sustainability reports, thus losing the additional benefit of feedback from their stakeholders regarding specific aspects of their environmental performance.

Differentiating variables

As indicated earlier, the firms' region and environmental sensitivity of the industry group are significantly associated with environmental performance and sustainability reporting quality. Thus, I further investigate each category of these variables. I also run a further sensitivity analysis using the environmental performance of each firm compared with the industry average. I separate the sample into two subsamples of leaders and laggards, i.e. firms whose environmental performance is higher or lower, respectively, than the average in the same industry group.

Region: The regional analysis indicates that the two-stage least squares model is well specified, with the differences in the systems explaining the difference in performance scores (Europe: R^2=0.80 vs. North America: R^2=0.74). European firms have higher performance scores (M=55.79) than North American firms (M=49.81), showing strong significance (t (3,398)=16.40, p=0.00). Similar results are found for reporting but with lower means: European firms (M=32.27) and North American firms (M=15.89), (t (4,368)=14.75, p=0.00).

Insert Table 2.5 about here

Increased board diversity improves environmental performance in both the North American and European samples (β=0.01, p=0.00 for both samples). However, as a result of quite different approaches to corporate governance in North America and Europe, the existence of a high level of responsibility, such as a board or executive committee (β=0.01, p=0.00) in Europe has a significant positive effect on environmental performance, whereas this is not evident in the North American sample. For the European sample, chair/CEO separation (β=0.01, p=0.10) has low significance. However, board independence (β=0.01, p=0.03) is significant in improving performance in the North American but not the European sample.

The operational components of policy and an EMS are significantly associated with better environmental performance in both regions, except for EMS certification in North America. The results indicate that on average, a one-unit increase in policy and EMS scores improves environmental performance by three percent (β=0.03, p=0.00). External assurance of the report improved environmental performance for the European sample (β=0.02, p=0.00) and for the North American sample (β=0.03, p=0.00). This is likely because assurance is more common among European firms than among North American firms. In the European sample, 22 percent of

the sample used “best practice” report assurance, whereas only four percent of the North American sample used the same high standard of assurance.

Environmentally sensitive industry grouping: With performance as the independent variable, the model was well specified and significant for both groups: non-environmentally sensitive ($F(50,3083)=261.59$) ($M=51.76$) and environmentally sensitive ($F(36,1199)=94.80$) ($M=55.26$), and significantly different ($t\ (4368)=–9.73$, $p=0.00$). Similar results occurred for reporting: Chi-squared (28)=521.26 ($M=19.86$) for non-environmentally sensitive, and Chi-squared (28)=141.63 ($M=26.77$) for environmentally sensitive ($t=–6.58$, $p=0.00$) indicates that the reporting quality in each industry grouping is significantly different.

In relation to all the strategic and operational components, along with the two dependent variables of environmental performance and sustainability reporting quality, the environmentally sensitive group scored higher than the non-environmentally sensitive group, except for board diversity and chair/CEO separation (see Table 2), but the differences were not significant: board diversity (NonSens: $M=39.22$; Sens: $M=38.16$, $t=0.41$) and chair/CEO separation (NonSens: $M=56.35$; Sens: $M=55.46$, $t=0.54$, $p=0.59$).

For both groups, the operational components of the system outshine the strategic components, similar to the regional analysis. Although several of the strategic components show significance, it is sporadic. However, for both industry groupings, all operational components are strongly significant. The non-environmentally sensitive group is reported first in the following statistics: policy: $\beta=0.03$, $\beta=0.02$, $p=0.00$; EMS: $\beta=0.04$, $\beta=0.01$, $p=0.00$; EMS certified: $\beta=0.02$, $\beta=0.03$, $p=0.00$; and assurance of the report: $\beta=0.03$, $\beta=0.02$, $p=0.00$. Thus, on average, in non-environmentally sensitive firms, a one-unit increase in the operational components increases environmental performance by two percent while in environmentally sensitive firms the increase

is one percent. Environmentally sensitive industries are often acutely aware of their impacts, especially as a result of external pressure. Therefore, many started early, and have had more time to develop sophisticated systems as a result of the nature of their business and the regulations that have been developed. However, non-environmentally sensitive industries are not exposed to the same external pressures, and often lag behind in the development of their sustainability systems.

The second stage of the model is used to determine the relationship between sustainability reporting quality and environmental performance. For both groups, environmental performance is significant in predicting reporting quality. However, the coefficient is smaller for the non-environmentally sensitive group (β=2.53, p=0.00) than for the environmentally sensitive group (β=7.38, p=0.00). Based on the strength of the coefficients, the environmental performance of environmentally sensitive groups improves by more than double the improvement of non-environmentally sensitive firms as the quality of reporting increases. This result provides support for using the sustainability report as a continuous improvement mechanism, especially when the firm engages its stakeholders' views on potential improvements in performance and reporting.

Leaders vs. laggards by industry group: For greater insight into the systems components for each industry group, I separate industry group leaders and laggards based on their own industry mean for environmental performance. The two models were well specified: leaders ($F(58,1893)=36.88$; laggards $F(58,2359)=56.54$). In addition, the two groups were significantly different in their systems ($t(4368)=-72.25$, p=0.00).

When compared with their own industry group, it became clear that the leaders take a systems approach, outperforming the laggards on all significant variables. The relationship between strategic system components and performance shows stronger significance for the

leaders compared with the laggards. The t-tests confirm the differences in all components except chair/CEO separation (leaders: M=55.48 vs. laggards: M=56.60, t=0.46) and board independence (leaders: M=35.57 vs. laggards: M=48.55, t=10.44). All operational components are significant for the leaders (p=0.00). Only policy (β=0.01, p=0.00) and EMS (β=0.04, p=0.00) are significant for the laggards, while EMS certification (β=0.003, p=0.47) and report assurance (β=0.009, p=0.18) are insignificant. For the leaders, the operational components EMS (β=0.03, p=0.00) and policy (β=0.04, p=0.00) improve the environmental performance by three and four percent, respectively.

Additionally, the leaders provide a higher quality of sustainability reporting (leaders: M=28.52 vs. laggards: M=16.40). There is a significant positive association between performance and reporting quality in the leaders group (β=4.58, p=0.00), while the association in the laggards group is negative and insignificant (β=–0.05, p=0.90).

Section 5: Conclusions and discussion

By applying the two-stage least squared regression model, I provide support for the importance of firms using a systems approach consisting of both strategic and operational components to achieve better environmental performance and high-quality reporting. I find that strategic components, when integrated with operational systems, lead to better performance and reporting consistent with the RBV. Thus, I recommend a holistic systems approach to firms wanting to maximize their sustainability objectives.

My research shows that a systems approach is essential when studying sustainability performance and quality of reporting, and that the RBV explains differences in environmental performance and reporting. While isolated components in a system will provide mediocre or low-quality performance and reporting, the best performing and reporting firms have a more

comprehensive and well-developed system of resources to support specific aspects of performance. This feedback may be provided through a number of different vehicles, but the one targeted in this research, the sustainability report, if prepared based on the highest levels of the GRI, requires stakeholder engagement to determine the materiality of various aspects of its sustainability performance, which in turn improves performance if acted upon.

In the overall analysis, both strategic and operational characteristics are positively associated with better environmental performance, which in turn is positively associated with reporting quality. At the strategic level, the results, similar to those of Clarkson et al. (2008a) and Rossouw (2005), suggest that the existence of a sustainability committee and board diversity are the most effective predictors of improved environmental performance.

Future research will address the importance of the gender diversity of the sustainability committee, which might indeed prove to be of greater significance than the gender diversity of the entire board. In addition, different types of diversity, such as experience, age, education, and tenure, might prove to be more significant. In contrast, the associations between executive compensation and chair/CEO separation and sustainability performance are insignificant. These results could be the result of the lack of detailed disclosure of remuneration policies by the few firms that currently use this approach. It appears that if the board has strong sustainability governance principles incorporated into its structure and composition, these characteristics override the necessity for the chair and the CEO to be separate people. Of the operational components, even though all were significant (policy, an EMS, certification of the EMS, and external assurance of the report), the quality of the EMS, a system in itself, is the most important indicator of superior environmental performance, which in turn predicts the quality of sustainability reporting (Morrow *et al.*, 2002; Klassen *et al.*, 1996).

In the most revealing analysis, I compared leaders with laggards in their own industry, based on the mean performance of the industry. Leaders clearly outshone laggards in terms of all systems components, both strategic and operational. However, differentiating firms based on region and environmental sensitivity also provided insights. European firms and firms in environmentally sensitive industries have more developed systems (Herremans et al. 2009; Bansal and Roth 2000).

At the strategic level, the significance of having a sustainability committee, linking executive compensation to sustainability objectives, and board diversity became clear when comparing leaders and laggards within their own industries. The significance of these components is less clear in the overall, regional, and environmental sensitivity analyses.

My research clarifies some of the mixed results found in prior research at the strategic level (Walls et al. 2012), demonstrating the importance of my differentiating variables; however, the greater contribution of my research is providing insight into the importance of the less-researched operational components compared with the strategic governance components. In all contexts, when investigating the differentiating variables, my operational variables are significant in predicting a high level of performance and reporting. The only operational variable that is not significant in the regional analysis is EMS certification for North American firms, which is less common in this region. When analyzing laggards, EMS certification and report assurance are insignificant compared with leaders, whose operational components are significant.

My research also contributes to the research on sustainability performance by clarifying the role of the sustainability report in the achievement of a high level of environmental performance (Al-Tuwaijri et al. 2004a; Clarkson et al. 2008a). Past research has often investigated the role of the sustainability report as a one-way communication vehicle (from the firm to stakeholders). My

research shows that if reporting is of a high quality, it can act as a vehicle of communication both to and from the stakeholders to identify material aspects to be targeted for improved environmental performance. The firm loses this important tool for improved environmental performance if it does not produce a sustainability report.

I encourage researchers to avoid investigating isolated components of a system to determine their effects on performance, and rather to develop research models that more accurately reflect the firm's actual operations. My research also finds that the sustainability report can be an important feedback mechanism to help target the firm's performance improvement to material aspects of the environment in which they operate.

Section 6: Appendix
Figure 2.1. Definition of variables and scoring methodology

Panel A: ***Dependent variables (performance and reporting quality)***

Environmental performance: this indicator provides assessment of the firm's environmental performance on three main pillars of: 1- Operations measured by: • Environmental Fines and Non-monetary Sanctions • Participation in Carbon Disclosure Project (Investor CDP) • Programmes and Targets to Reduce Direct GHG Emissions • Programmes and Targets to Increase Renewable Energy Use 2- Contractors & Supply Chain measured by: • Formal Policy or Programme on Green Procurement • Contractors & Supply Chain Related Controversies or Incidents 3- Products & Services • Sustainability Related Products & Services • Products & Services Related Controversies or Incidents Each variable is scored between 0-100 with 0 the lowest and 100 the highest level of the performance. The overall environmental performance is the average of the all the eight mentioned indicators,
CSR Report Quality (CSRReportQuaity): This indicator analyses the manner by which a company reports on ESG matters and if it conforms to the international standards and best practices. The higher is the application level of the GRI, the higher is the score for the quality of the reporting. – This categorical variable is scored between 0-100 according to the level of the GRI applied in their sustainability reporting (level A, B, C, or not used GRI).

Panel B: ***Strategic Components***

Board ESG (BoardESG): This indicator assesses the CSR responsibilities assigned to management or the board members. This categorical variable is scored between 0-100 according to the management/board responsibility for the ESG issues (existence of the committee at the board/management level (high or low), the level of the existence is not disclosed, or the committee is only responsible for governance issue, or there is no board oversight of ESG issues.
CSR Compensation (BoardCSRComp): This indicator provides an assessment of whether a part of executive remuneration is explicitly linked to sustainability performance targets, such as health and safety targets, environmental targets, etc. – This categorical variable is scored between 0-100 according to how the executives' compensation is tied to the sustainability performance (explicitly tied, there are sustainability targets for the executives compensation but there is no reference for the remuneration policy, or compensation is not explicitly tied to the sustainability performance.
Board Diversity (BoardDiv): This indicator denotes the number of women on company boards. In case of two-tier structures, the composition of the Executive board as well as the supervisory board is considered. – This categorical variable is scored between 0-100 according to the number of the women on the board (three or more, two, one, or none women on the board)
Board Separation (BoardSep): This indicator provides an assessment on whether the positions of chairman of the board and CEO are combined or not.

– This categorical variable is scored between 0-100 according to the separation roles of the board chair and the CEO (separate role, not separate role, or the data does not exist)
Board Independence (BoardInd): This indicator provides an assessment of the dependency of supervisory board members for two-tier boards, or, the dependency of board of directors' members for one-tier boards. – This categorical variable is scored between 0-100 according to degree of the dependency of the board members (up to one supervisory board member is dependent, two supervisory board members are dependent, between ½-2/3 of the board members are dependent)

Panel C: ***Operational Components***

Report Assurance (VerifyReport): This indicator provides an assessment of whether the company's sustainability report has been externally verified according to a report assurance standard. This categorical variable is scored between 0-100 according to the quality of the assurance of the sustainability reporting (best practice, below best practice, external assurance with deficiency, or no external assurance)
EMS: This indicator provides an assessment of the quality and comprehensiveness of a company's Environmental Management System. – This categorical variable is scored between 0-100 according to details of the environmental management system and how many elements are included in the environmental management system (detailed,
EMS Certified: This indicator provides an assessment of whether the company's Environmental Management System has received external certification (i.e. according to the ISO 14001 standard). – This categorical variable is scored between 0-100 according to the level of the EMS certificate (level of the certified measured by 90% or more, between 75%-90%, between 50%-75%, between 50%-75%, between 25%-50, below 25%, the data is not disclosed, or there is no certified EMS on place)
Environmental Policy: This indicator provides an assessment of the quality of the firm's environmental policy – This categorical variable is scored between 0-100 according to quality of the environmental policies. (Strong and detailed, only strong, have policy but not detailed, no formal policy, or the data is not disclosed)

Figure 2.2. Research model: Internal controls, environmental performance, and sustainability reporting

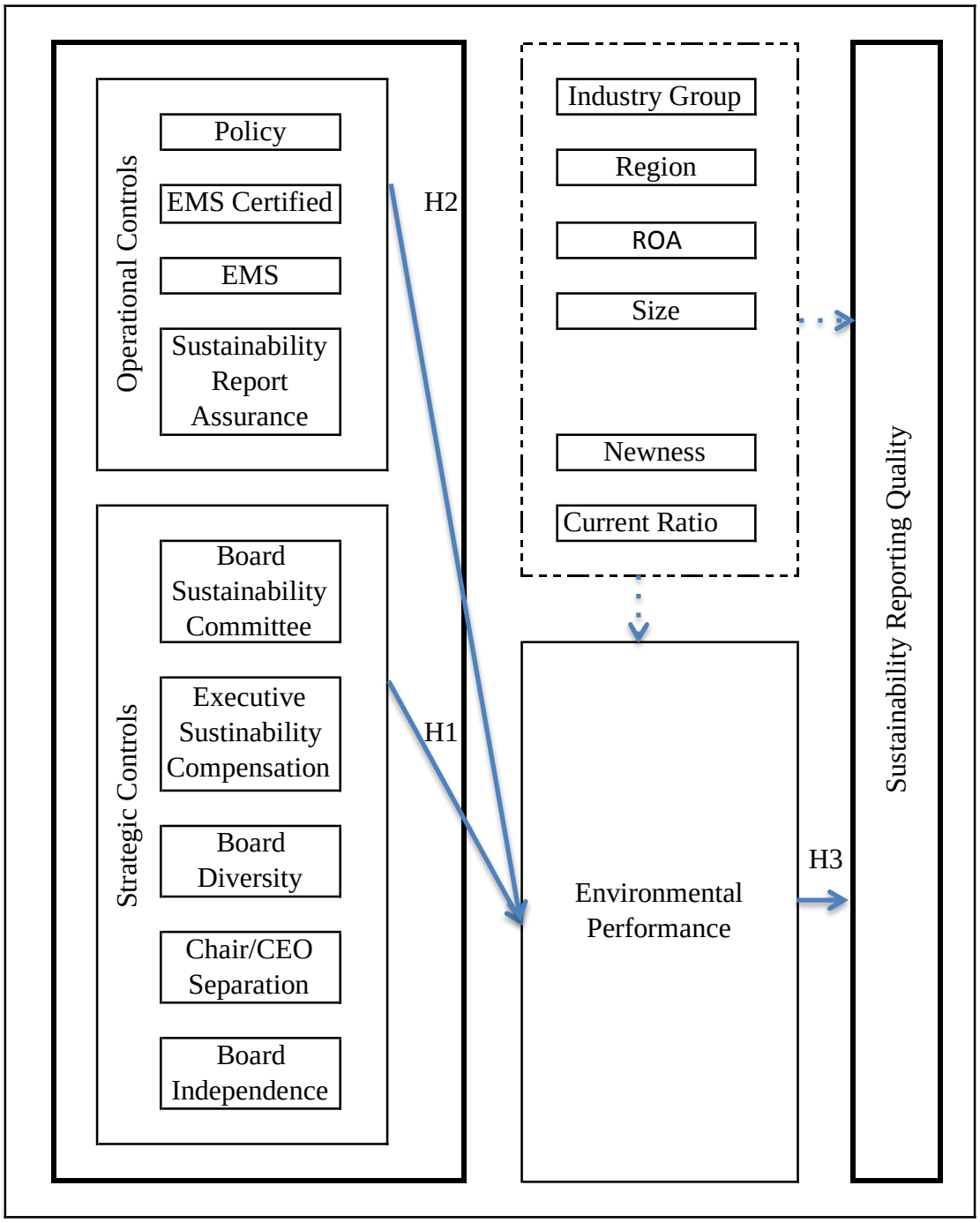


Table 2.1. Segmentation of sample by year, industry group, and performance

Regions	A) Year			B) Environment sensitivity		C) Performance		Total	Percentage
	2009	2010	2011	Non Sensitive	Sensitive	Laggards	Leaders		
Asia-Pacific	414	429	121	746	218	453	511	964	22%
Europe	444	497	531	1,111	361	585	887	1472	34%
Latin America	0	3	3	4	2	4	2	6	0%
North America	625	649	654	1,273	655	1,376	552	1928	44%
Total	**1483**	**1578**	**1309**	**3134**	**1236**	**2418**	**1952**	**4370**	**100%**
Percentage	**34%**	**36%**	**30%**	**72%**	**28%**	**55%**	**45%**	**100%**	

Table 2.2. Descriptive statistics

Variable	Overall				A) Region		B) Environment sensitivity		C) Performance	
	Mean	S.D	Min	Max	EU	NA	Sens	Non	Laggards	Leaders
Performance	52.75	10.85	20.29	90.77	55.79	49.81	55.26	51.76	45.49	61.74
Report quality	21.82	31.40	0.00	100	32.27	15.89	26.77	19.86	16.40	28.52
Sustainability Board committee	47.70	40.75	0.00	100	46.01	43.29	44.53	55.73	33.74	64.98
Exec compensation	5.88	22.89	0.00	100	6.79	4.71	3.81	11.12	4.09	8.08
Board diversity	38.92	38.12	0.00	100	34.39	54.90	39.22	38.16	37.98	40.09
Chair/CEO separation	56.10	49.41	0.00	100	83.87	43.46	56.35	55.46	56.60	55.48
Board independence	42.31	44.57	0.00	100	42.58	54.55	39.81	48.62	48.55	34.57
Policy	45.23	35.87	0.00	100	52.50	37.36	42.64	51.82	30.47	63.52
EMS	46.65	41.02	0.00	100	54.29	36.32	42.37	57.52	25.14	73.30
EMS certified	22.85	31.67	0.00	100	28.23	12.97	21.50	26.27	10.41	38.26
Sustainability Report assurance	13.22	31.84	0.00	100	26.78	4.64	11.21	18.31	4.53	23.98
ROA%	4.93	4.75	-6.05	22.33	4.56	6.01	4.95	5.03	5.41	4.44
Size	10.19	2.28	4.60	19.13	9.59	9.30	10.33	9.85	9.63	10.89
Newness	0.52	0.18	0.06	1.00	0.50	0.54	0.50	0.58	0.54	0.50
Current ratio%	1.84	2.77	0.00	64.43	1.31	2.07	1.76	2.04	2.00	1.64

Analysis Legend: A) Regional (Europe (EU), North America (NA), B) Industry Group (Non-Sensitive (Non), Sensitive (Sens), C) Performance (Laggards (Lag), Leader (Lead))

Table 2.3. Pearson correlation results

Variable		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Report Quality	1.00																
2	Environmental performance	0.24*	1.00															
3	Sustain Committee	0.13*	0.41*	1.00														
4	Board Compensation	0.16*	0.11*	0.20*	1.00													
5	Board Diversity	0.010	0.04*	0.07*	0.08*	1.00												
6	Board Separation	0.17*	-0.03	-0.14*	0.06*	-0.07*	1.00											
7	Board Independence	0.14*	-0.11*	-0.11*	0.05*	0.14*	0.19*	1.00										
8	Report Audit	0.41*	0.33*	0.25*	0.18*	0.03*	0.10*	-0.05*	1.00									
9	Policy	0.21*	0.51*	0.38*	0.09*	0.05*	-0.05*	-0.08*	0.28*	1.00								
10	EMS	0.22*	0.66*	0.52*	0.15*	0.04*	-0.11*	-0.17*	0.33*	0.58*	1.00							
11	EMS Certification	0.15*	0.53*	0.35*	0.10*	-0.04*	-0.08*	-0.19*	0.22*	0.43*	0.69*	1.00						
12	ROA	-0.010	-0.02	-0.09*	0.00	0.07*	-0.03	0.09*	-0.05*	-0.10*	-0.06*	-0.04*	1.00					
13	Size	0.05*	0.18*	0.32*	0.04*	-0.11*	-0.27*	-0.34*	0.11*	0.25*	0.29*	0.26*	-0.3*	1.00				
14	PP&E Newness	-0.020	-0.18*	-0.12*	0.05*	-0.04*	0.05*	0.06*	-0.03	-0.15*	-0.18*	-0.22*	-0.05*	-0.07*	1.00			
15	Current Ratio	-0.04*	-0.03	-0.06*	0.00	-0.06*	-0.03*	0.03	-0.09*	-0.07*	-0.05*	-0.01	0.06*	-0.06*	0.03	1.00		
16	Industry Group	0.1*	0.15*	0.12*	0.14*	-0.01	-0.01	0.09*	0.10*	0.12*	0.17*	0.07*	0.01	-0.10*	0.19*	0.05*	1.00	
17	Region	-0.11*	-0.21*	-0.13*	-0.04*	0.41*	-0.12*	0.29*	-0.17*	-0.18*	-0.22*	-0.29*	0.19*	-0.49*	0.09*	0.04*	0.11*	1.00

Table 2.4. Model testing results

Step 1.

Dependent: Environmental performance	**p**	**Coef.sig (t)**
ESG Committee	0.01	0.01*** (2.63)
Executive CSR Compensation	0.52	0.002 (0.64)
Board Independence	0.31	0.002 (1.02)
Board Diversity	0.00	0.01*** (3.25)
Board Separation	0.06	0.003* (1.88)
Report Audit	0.00	0.03*** (10.13)
Policy Score	0.00	0.03*** (9.58)
EMS Score	0.00	0.03*** (8.46)
EMS Certified	0.00	0.02*** (6.08)
ROA	0.95	0.001 (0.06)
Size	0.07	0.095* (1.82)
Newness	0.65	-0.25 (-0.45)
Current Ratio	0.94	-0.002 (-0.08)
Region	0.11	-0.14 (-1.58)
Industry Group	0.40	-0.83 (-0.84)
Constant	0.00	40.69*** (39.16)
Industry Group Dummy	Yes	
Year Dummy	Yes	
F (59, 4310)	268.82	
R-squared	0.79	
Adj R-squared	0.78	

***, **, and * denote significance levels (two-tailed) at p <0.01, p<0.05, and p<0.10, respectively

Step 2.

Dependent: Reporting quality	**p**	**Coef.sig (t)**
Environmental Performance	0.00	4.03*** (15.83)
ROA	0.06	0.2* (1.88)
Size	0.00	-2.24*** (-7.28)
Newness	0.54	2.26 (0.61)
Current Ratio	0.41	0.16 (0.83)
Region	0.00	-1.99*** (-4.01)
Industry Group	0.48	4.67 (0.71)
Constant	0.00	-137.78*** (-11.02)
Industry Group Dummy	Yes	
Year Dummy	Yes	
Wald chi 2(51)	53.62	

***, **, and * denote significance levels (two-tailed) at p <0.01, p<0.05, and p<0.10, respectively.

Table 2.5. Analysis of differentiating variables

Step 1

Dep: Environmental Performance	A) Region				B)Industry Group				C) Relative Performance			
	Europe		North America		Sens		Non Sens		Leaders		Laggards	
	p	coef.sig (t)	p	coef.sig (t)	p	coef.sig (t)	p	coef.sig (t)	p	coef.sig (t)	p	coef.sig (t)
ESG Committee	0.00	0.01*** (3.54)	0.81	0.001 (0.24)	0.10	-0.01 (-1.63)	0.00	0.01*** (4.66)	0.03	0.01** (2.22)	0.01	0.01*** (2.78)
Executive CSR Compensation	0.76	0.002 (0.3)	0.28	0.01 (1.09)	0.50	-0.004 (-0.67)	0.03	0.01** (2.22)	0.01	0.01** (2.5)	0.01	-0.01** (-2.52)
Board Independence	0.92	0.0004 (0.1)	0.04	0.01** (2.06)	0.08	0.01* (1.77)	0.83	-0.0005 (-0.21)	0.43	0.003 (0.79)	0.32	-0.002 (-1)
Board Diversity	0.00	0.01*** (3.35)	0.02	0.01** (2.38)	0.03	-0.01** (-2.13)	0.00	0.01*** (5.59)	0.01	0.01*** (2.8)	0.03	0.01** (2.22)
Board Separation	0.12	0.01 (1.54)	0.72	0.001 (0.36)	0.67	-0.002 (-0.43)	0.02	0.005** (2.33)	0.16	0.004 (1.42)	1.00	-0.000004 (0)
Report Audit	0.00	0.02*** (3.83)	0.00	0.03*** (4.67)	0.00	0.02*** (4.48)	0.00	0.03*** (10.23)	0.00	0.03*** (9.44)	0.86	0.0009 (0.18)
Policy Score	0.00	0.03*** (6.76)	0.00	0.03*** (6.6)	0.00	0.02*** (2.88)	0.00	0.03*** (9.36)	0.00	0.04*** (8.8)	0.00	0.01*** (4.14)
EMS Score	0.00	0.03*** (5.02)	0.00	0.02*** (4.57)	0.03	0.01** (2.15)	0.00	0.04*** (9.88)	0.00	0.03*** (4.76)	0.00	0.04*** (9.13)
EMS Certified	0.00	0.04*** (5.86)	0.84	-0.001 (-0.2)	0.00	0.03*** (5.01)	0.00	0.02*** (3.7)	0.00	0.03*** (5.58)	0.64	0.003 (0.47)
ROA	0.06	-0.06* (-1.89)	0.81	0.01 (0.24)	0.27	0.04 (1.1)	0.95	0.0012 (0.06)	0.71	-0.01 (-0.38)	-0.03	0.02*** (0.89)
Size	0.00	0.37*** (3.15)	0.05	-0.24** (-1.98)	0.50	-0.08 (-0.67)	0.00	0.18*** (3.06)	0.09	0.14* (1.69)	0.38	-0.06 (-0.89)
Newness	0.73	-0.37 (-0.35)	0.63	0.45 (0.48)	0.15	1.63 (1.46)	0.08	-1.14* (-1.76)	0.87	-0.17 (-0.16)	0.49	-0.43 (-0.69)
Current Ratio	0.41	-0.15 (-0.82)	0.98	0.001 (0.03)	0.84	0.01 (0.21)	0.23	-0.04 (-1.21)	0.00	-0.2*** (-3.04)	0.04	0.06** (2.11)
Region					0.01	-0.51*** (-2.76)	0.81	-0.02 (-0.24)	0.66	0.07 (0.44)	0.00	-0.47*** (-4.92)
Industry Group	0.68	0.71 (0.42)	0.23	-1.62 (-1.21)					0.60	0.8 (0.53)	0.31	-1.26 (-1.01)
Intercept	0.00	35.74*** (20.88)	0.00	44.19*** (29.36)	0.00	47.12*** (23.46)	0.00	39.22*** (36.29)	0.00	48.37*** (27.12)	0.00	45.98*** (37.77)
Industry Group Dummy	Yes		Yes		Yes		Yes		Yes		Yes	
Year Dummy	Yes		Yes		Yes		Yes		Yes		Yes	
#Observtions	1,472		1,928		1,236		3,134		1,952		2,418	
F(59, 4310)	96.48		95.02		94.80		261.59		36.88		56.54	
Prob > F	0.00		0.00		0.00		0.00		0.00		0.00	
R-squared	0.80		0.74		0.74		0.81		0.53		0.58	
Adj R-squared	0.79		0.74		0.73		0.81		0.52		0.57	

Step 2

Dep: Reporting Quality	**p**	**coef.sig (t)**	**p**	**coef.sig (t)**	**p**	**coef.sig (t)**	**p**	**coef.sig (t)**	**p**	**coef.sig (t)**	**p**	**coef.sig (t)**
Environemntal Performance	0.00	3.1*** (7.9)	0.00	3.9*** (8.41)	0.00	7.38*** (8.56)	0.00	2.53*** (11.5)	0.00	4.58*** (15.72)	0.90	-0.05 (-0.12)
ROA	0.67	-0.09 (-0.42)	0.17	0.18 (1.37)	0.25	0.35 (1.14)	0.45	0.08 (0.75)	0.36	0.18 (0.92)	0.03	0.24** (2.22)
Size	0.33	0.84 (0.98)	0.01	1.64** (2.53)	0.28	-1.01 (-1.09)	0.00	-2.14*** (-6.92)	0.00	-2.4*** (-5.36)	0.15	-0.55 (-1.44)
Newness	0.89	-1.04 (-0.14)	0.00	-19.45*** (-3.51)	0.94	-0.7 (-0.07)	0.63	-1.89 (-0.48)	0.94	0.49 (0.08)	0.06	-7.66* (-1.89)
Current Ratio	0.09	2.13* (1.71)	0.00	0.87*** (3.06)	0.73	0.17 (0.35)	0.51	0.14 (0.67)	0.29	0.43 (1.06)	0.13	0.3 (1.53)
Region					0.28	1.71 (1.08)	0.00	-2.38*** (-4.82)	0.89	-0.11 (-0.14)	0.00	-4.49*** (-8.28)
Industry Group	0.19	15.68 (1.31)	0.69	-3.18 (-0.4)					0.30	-9.34 (-1.03)	0.02	19.66** (2.42)
Intercept	0.00	-129.94*** (-7.59)	0.00	-168.84*** (-7.87)	0.00	-314.6*** (-6.99)	0.00	-70.49*** (-6.51)	0.00	-217.96*** (-11.52)	0.02	46.12** (2.37)
Industry Group Dummy	Yes		Yes		Yes		Yes		Yes		Yes	
Year Dummy	Yes		Yes		Yes		Yes		Yes		Yes	
Wald chi2(51)	328.19		341.63		141.63		521.26		509.87		342.55	
Prob > chi2	0.00		0.00		0.00		0.00		0.00		0.00	
R-squared	0.08		.		.		0.06		.		0.12	

***, **, and * denote significance levels (two-tailed) at p=0.01, p=0.05, and p=0.10, respectively

Chapter Three: Study Two

The determinants and effects of the executive to non-executive pay ratio on sustainability performance

Abstract

I investigate the association between the pay ratio of top executive and non-executive employees (short-term and long-term pay packages) and sustainability performance. I study this association at two levels: 1) chief executive officers (CEOs) and non-executive employees and 2) non-CEO executives and non-executive employees. I explore the association between the pay ratio and sustainability performance by controlling for the endogeneity of the pay ratio that is determined by internal company factors, including the executive management structure and the firm structure. By applying a two-step least squares model in the first stage of my model, the results provide evidence that a firm's operational performance and its employee skills are positively associated with its pay ratio. In the second stage of my model, the determined pay ratio is negatively associated with sustainability performance after controlling for the executive management structure (gender diversity and dual responsibility of executives at the management and the board level) and the firm structure. I conclude that a high pay ratio is a tournament incentive for executives to increase a firm's operational performance. However, a high pay ratio is negatively associated with a firm's sustainability performance, which might be because of the non-executive employees' dissatisfaction about the perceived inequity in pay and because of inconsistencies in playing out the firms' sustainability values.

Section 1: Introduction

The executive pay ratio is an important element of a firm's financial and sustainability performance. To promote a high sustainability performance, firms develop sustainable policies and programs and engage and incentivize their employees to contribute to the sustainable activities (R. M. Puybaraud 2013). Different disciplines are interested in the issue of executive pay. Financial economists explore the association of executive pay packages with the firm's financial performance (Smith and Watts 1992), and sociologists and psychologists examine the relationship between the executives' pay and the pay of the non-executive employees (Indjejikian 1999) and the sustainability performance (Szekely and Knirsch 2005).

According to a nationwide survey, 74 percent of Americans from different genders, races, ages, political affiliations, household incomes, and states believe that the executive team is overpaid (Larcker et al. 2016). Larcker et al. (2016) also found that company shareholders now demand justification for the executive pay arrangements. The pay ratio in a firm is the ratio of the compensation to the top executive managers compared with the average compensation to the non-executive employees. A high pay ratio is perceived as unfair and leads to employee dissatisfaction over the cost to society or over concerns about the natural environment (Hinkley 2002).

I first address the determinants of the pay ratio between the executive and the non-executive employees. Next, I consider the association between the determined pay ratio and the sustainability performance. Following Faleye et al. (2013), I start by examining the determinants of the pay ratio. The main assumption is that the pay ratio is contingent on the bargaining power of the chief executive officer (CEO) and of the other top executives, such as the vice presidents (VPs) (Faleye et al. 2013; Shin 2014). The bargaining power of the executives toward the board members and of the non-executive employees toward the executive managers are the

determinants and the constraints of each party for their compensation (Shin 2014). I categorize the determinants of the pay ratio of the executive managers as: 1) operations (financial performance and complexity), 2) management structure (gender diversity and dual responsibility of the executives), and 3) financial structure (book-to-market ratio, firm size, current ratio, leverage, and capital expenditure ratio) (Faleye et al. 2013).

Moreover, I study the consequences of a high pay ratio. The proposed rules for corporate sustainability suggest paying the top executives no more than 12 times that paid to the lowest paid employees (Hinkley 2002). Employee job satisfaction is connected to pay satisfaction (Aryee et al. 2002). Moreover, the employees' job satisfaction is consistent with the values of a sustainable firm and the improvement in the stock value (Edmans 2012). Employees compare their pay packages with those of the executives, and with those of their peer group in their organization or in other firms. Large differences in pay may be perceived as unfair and thus can affect employee task performance (motivation and effort at work) and contextual performance (cooperation with colleagues) (Sieweke et al. 2016).

I contribute to the existing body of knowledge not only by describing how the internal factors—including the operating performance and the governance factors—predict the pay ratio, but also by investigating how the pay ratio affects the sustainability performance. Sustainability performance has a broad definition (encompassing economic, environmental, and social issues) and a firm's activities are complex. Hence, I focus on one dimension of sustainability performance: the natural environment.

First, the results show that the operational performance, measured by the revenue per employee and by employee skills, predicts higher pay ratios. Employee skills are measured by the physical capital intensity and by the research and development (R&D) intensity. Moreover, the executive team structure, including the female ratio at the executive level and the responsibility

of the executives at the board level, are negatively associated with the pay ratio. Larger firms have lower pay ratios.

Second, a high pay ratio is associated with a low sustainability performance. This result may reflect the employees' loss aversion for the unequal pay between the top executives and the lower paid employees. Previous studies suggest that a feeling of loss could result when employees perceive that they are receiving pay that is misaligned with the their efforts and/or the firm's published sustainability values (Mellers 2000). This feeling of loss affects the individual outcome of the employees and their work pleasure and satisfaction, which can all lead to a reduced job performance (Mellers 2000).

Third, I distinguish between the employee rank (CEO and VPs) and the time period of the pay (short-term and long-term pay). Short-term pay, including salary and bonuses, motivates the executives to focus on short-term outcomes at the expense of long-term values. An over-emphasis on short-term outcomes might lead to crises that result from excessive risk taking (Bebchuk and Fried 2006). For that reason, the United States (US) introduced its Troubled Asset Relief Program (TARP) in 2008 that required the elimination of excessive risk taking by firms. Previous studies suggest using long-term incentives (such as stock options and equity pay in compensation packages) for executives to enhance sustainable performance (Bebchuk and Fried 2010).

I investigate both short-term incentives (salary and bonuses) and long-term incentives (equity and stock options at the granted value) in the pay packages of the executives. Consequently, the results are robust for the hierarchy of the employees at the executive management level and for short-term/long-term pay. Ignoring how the pay ratio is measured (by short-term or long-term compensations) at this time, the results show that a large pay ratio leads to a low sustainability performance.

The pay ratio and its effects on an organization's financial structures and operational performance, which are the relevant factors in determining the employees' pay contracts, have been widely studied (Mishel and Davis 2014). Nevertheless, business advisors point to the necessity of determining the link between sustainability performance and employee pay, to fulfill firms' environmental and social obligations.

Scholars apply agency theory to explain the relationship between the organization's performance and pay (Rekker et al. 2014). Pay arrangements are structured so that managers avoid pursuing short-term profit at the expense of long-term performance, or taking excessive risks that can jeopardize the security and reliability of the organizations' performance. Thus, the question arises: What is a fair and effective pay to incentivize improved performance without excessive risk and to align the executives' own personal objectives with those of their firm?

On one hand, their pay packages can induce the executives to achieve a good financial performance. This performance can be at the cost of the other employees' satisfaction, which might lead to a low sustainability performance. The issue of unequal pay to employees at different levels of the organization is of concern to the shareholders and to other stakeholders. By applying tournament theory, some scholars argue that a wide pay ratio between executives and non-executive employees provides incentives to the employees to be promoted to higher organizational levels to thereby achieve better compensation (Downes and Choi 2014). However, there is little empirical evidence to support this theory (Larkin et al. 2012).

On the other hand, behavioral agency theory states that a high performance might be achieved with a small pay ratio. Pepper and Gore (2015) argue that agency theory is too simplistic, and that it needs to be modified by considering the role of human capital and the worker motivations for performing at their best abilities. By adding the equitable pay, loss aversion, and time preference assumptions, behavioral agency theory explains that an inequity

between the workers' input (performance and skills) and their output (pay) can cause dissatisfaction and demotivation that leads to a low contribution and hence to a low outcome. The rationale is that when the pay ratios are too large, the lower paid employees consider their wages to be inequitable and react negatively by withholding effort (Adams 1965). Moreover, the workers are loss and risk averse. Above a certain level, when there is the possibility of gain the employees are risk takers whereas below that level, since they effectively are in the loss condition, they are more loss averse.

Using archival firm data and applying behavioral agency theory, I analyze employee behavior in regard to firm performance, which is affected by the ratio of executive pay to the pay of the other employees. I use archival data from Standard and Poor's (S&P) ExecuComp database and from the Compustat database. I limit the sample to the firms that provided their environmental and social information to the MSCI ESG KLD Stats database (KLD)[3] in the period 2008–2013. My primary measure of the pay ratio is (the natural log of) the ratio of the executives' compensation to the average non-executive employees' pay. I separately investigate pay ratio using two different definitions: 1) CEO pay compared with the average non-executive employee pay; and 2) average pay to the top five VPs (excluding the CEO) compared with the non-executive employee pay. I analyze the association of each predicted ratio with the sustainability performance of the firm.

Section two of this paper develops the theory and the hypotheses on the sources and outcomes of the pay ratio between executives and non-executive employees. In section three, I

[3] MSCI (formerly KLD Research & Analytics Inc.) provides research-based indexes and analytics. MSCI ESG Research compiles an annual data set of environmental, social, and governance (ESG) ratings for approximately 3,000 of the largest US publicly traded companies and for the MSCI KLD 400 social index. The MSCI raking system includes over 60 ESG indicators in seven ESG categories.

discuss the empirical analysis, including the sample, data collection, model, variables, and data analysis. Finally, section four summarizes and concludes the paper.

Section 2: Theoretical framework and hypothesis development

Agency theory generated two branch theories that are used to investigate the effect of the pay ratio between the executives and the non-executive employees on a firm's financial performance: tournament theory and behavioral theory.

Researchers apply tournament theory to explain that a large discrepancy between executive and non-executive pay enhances a firm's performance. In other words, there is a positive relationship between a high pay ratio and a firm's financial performance (Lazear and Rosen 1979), and a bigger pay ratio will lead to a better performance. Lazear and Rosen (1979) applied tournament theory to imply that employees are more efficient in a competitive context, and that a high pay ratio is an incentive for the employees to increase their performance to be promoted and thereby increase their compensation level.

Contrastingly, some scholars use behavioral theories to illustrate the negative relationship between the pay ratio and the performance (Masulis and Zhang 2013). For example, social identity theory (a behavioral theory) predicts a negative relationship between the pay ratio and the firms' performance (Mummendey et al. 1999).

Ridge et al. (2015) revisited the contradictory nature of the behavioural theories and the tournament theory by testing the pay ratio at different levels (low and high pay ratio levels). They included the range of the unequal pay at the executive level between the CEO and the VPs in their formulation. They found that the behavioural and the tournament agency theories are not contradictory. Rather their study provided evidence that the highest performance level is either at a meaningfully high pay ratio level or a meaningfully equal pay ratio (Ridge et al. 2015). This assumption implies a decreasing financial performance when the pay ratio increases from small

to moderate (e.g., the pay ratio between the CEO and the VPs). Thus, at a low or moderate pay ratio level, an increase in the pay ratio reduces the financial performance. However, at an above moderate-to-high pay ratio level, an increase is an incentive for employees to achieve a higher financial performance to be promoted to an organizational level with higher pay. Ridge et al. (2015) suggested that future similar studies should consider the contingent factors (including executive characteristics and firm structures) that affect the financial performance and the pay ratio.

Following their suggestions, I consider the contingent factors in determining the pay ratio. I explore the effect of the operating performance (operating income per employee, R&D intensity, and the physical capital intensity), the management structure (female ratio and the dual responsibility of the management at board level), the firm structure (size and market risk), and the financial performance (current ratio, leverage, and capital expenditure) on the pay ratio (Faleye 2011; Faleye et al. 2013; Core et al. 1999). Further, Luo et al. (2015) posit that security analysts consider sustainability performance information and incorporate it in their recommendations to general investors. By considering the impact of the firm's sustainability performance, managers obtain a holistic picture of the future financial impact of their investment in sustainable activities. Thus, the sustainability performance is connected to the firm's stock return (Luo et al. 2015). Following these arguments, I investigate the association between the pay ratio and the sustainability performance.

I review the literature to understand why each of these contingent factors is an important determinant of the pay ratio, which leads to my first hypothesis. Moreover, I explore the role of an increase in the pay ratio and its association with sustainability performance, which leads to my second hypothesis.

Pay ratio determinants

The assumption underlying the pay ratio determinants is the bargaining power of the executives with the board. In their meta-analysis study, Tosi et al. (2000a) focused on managerial power and on the CEO compensation level. They provided evidence from 219 studies of the influence of managerial power on the executives' compensation level and on corporate performance. On one hand, the operating performance (revenue per employee), the financial performance measured by the leverage ratio (debt-to-total asset) (Zeitun and Tian 2014)[4] and the capital expenditure ratio (Faleye 2011; Faleye et al. 2013) are negatively associated with the sustainability performance and the pay ratio. Moreover, large firms require capable management teams who are able to lead the growing companies in a competitive market. Thus, firm size and growth opportunities (book-to-market value of equity) predict a high compensation for the managers (Core et al. 1999).

On the other hand, Faleye et al. (2013) argued that executives have the authority to benchmark the productivity on their own pay, while lower rank employees lack the power and ability to influence their pay levels in the firm. This results in a higher pay ratio between the executives and the non-executive employees. Further, either the tournament incentives (measured by executive pay) are strong for the executives to improve the operational performance (particularly in the larger companies), or the high pay to the executives is because of the high responsibility levels of the executives in the firms that provide high executive pay.

I expect a high pay ratio when executives have a strong bargaining power advantage over the board, and when the non-executive employees have a low power to increase their compensation share from the operational performance. However, employee skills are the bargaining tool in determining the level of the payment. In high technology firms, the executives

[4] This study showed that a firm's capital structure (debt-to-equity) had a significantly negative effect on the sustainability performance.

spend a lot on R&D projects, which is a proxy for their skills (Andras and Srinivasan 2003). The ratio of physical capital to the number of employees is another indication that firms require highly skilled executives to manage their productivity (Parrino 1997). Physical capital, technology, and human skills have been recognized as complementary factors in production and profitability (Goldin and Katz 1996).

Executives' compensation is also affected by their bargaining power, which is influenced by their responsibilities at the board level (Faleye et al. 2013). Male executives have a greater power to negotiate than do female executives (Rekker et al. 2014), and female executive managers are more risk averse compared with their male counterparts (Huang and Kisgen 2013). The contingency approach considers that female executives have internal capabilities that can improve the firm's financial performance, thus increasing the female ratio is a positive factor for a firm's performance (Perryman et al. 2016). The female executives with the same level of operational performance negotiate less for their compensation than their male counterparts (Babcock and Laschever 2009). An increase in the executive level female ratio tends to improve the number of women at the lower levels of the organization. This will help the re-organization of the employee compensation packages to thereby reduce the pay ratio between the executives and the non-executive employees (Perryman et al. 2016).

Interestingly, Anderson and Bizjak (2003) show that the dual responsibility of executives at the board and management levels does not negatively affect the firms' value, nor does it affect the total executives' compensation. Accordingly, the management structure in my model includes the female ratio and the dual responsibility of the executives.

In summary, I argue that the bargaining power of the employees (including the executives) is associated with operational performance. Operational performance is composed of employee productivity (revenue per employee) and employee skills (R&D intensity and physical capital

intensity). I control for the management structure including the female ratio at the executive level, the dual responsibility of the executive managers (executive team and management board), the CEO dual responsibility, the firm structure, and the firm financial performance (book-to-market value, size, current ratio, capital expenditure ratio[5], and leverage).

Operational performance

Employee productivity. The primary construct of employee productivity is measured by the ratio of the revenue to the number of the employees (Cronqvist et al. 2009; Faleye et al. 2013). Applying tournament theory, the pay differential between the executives and the non-executive employees represents the incentive for the non-executive employees to be promoted to the management level. A high pay ratio may encourage the employees to increase their productivity level, which will in turn increase their compensation (Lazear and Rosen 1979). The bargaining power of the executive managers means that the tournament prize goes to them rather than to the non-executive employees. This results in a pay increase for the executives and thus a higher pay ratio. Consequently, there is a positive relationship between the employees' productivity and the pay ratio.

H1 (a): A high operational productivity increases the pay ratio after controlling for management structure, firm structure, growth opportunities, and financial performance.

[5] Capital expenditures are the amounts that firms use to purchase or upgrade physical capital (e.g., property, plant, and equipment). The capital expenditure ratio is the firm's financial ability to acquire long-term assets using free cash flow. That industry specific ratio is an indicator of financial strength to invest in the long-term assets. The physical capital intensity is the ratio of the net property, plant, and equipment to the total number of employees, which is used as an indicator of the employees' productivity. That ratio relates the employees' ability to apply the firm's capital assets in the firm's production of products or services (Goldin and Katz 1996).

Employee Skills. The employee skill level is measured by the R&D expenses normalized by the total assets (Barge-Gil and López 2013). Masulis and Zhang (2013) provide evidence that the executives gain more in compensation from strong employee productivity than do the other employees. Thus, the VPs and the CEO earn more pay, which results in an increase in the pay ratio. Consequently, I expect a positive relationship between the employee skills and the pay ratio.

Physical capital and technology are complementary indicators of employee skills, which provide bargaining power for the employees to obtain higher compensation (Goldin and Katz 1996). The power position means that executives earn higher compensation in comparison to the non-executive employees in firms with high physical capital. Thus, an increase in the physical capital increases the pay ratio.

By applying this line of research, I expect that an increase in the capital intensity ratio will positively affect the executives' compensation, which will lead to an increase in the pay ratio between the executives and the non-executive employees. Moreover, the R&D expenses, which are an indication of technological advances (Goldin and Katz 1996), increase the executives' power to gain more compensation in the organization.

H1 (b): The employees' skills, measured by the R&D intensity and the physical capital intensity, increase the pay ratio after controlling for management structure, firm structure, growth opportunities, and financial performance.

Pay ratio and sustainability performance

The organizational environment is complex, and scholars have explored the causes and effects of performance from different dimensions (financial, environmental, and social). Callan and Thomas (2011) use a simultaneous system of equations to consider the endogeneity of the sustainability performance, the financial performance, and the executive compensation. They

clarify the endogeneity and the interdependency of these factors, and indicate that the factors cannot be studied in isolation without considering the interdependencies. Sustainability studies provide evidence of an association between executive compensation and sustainability performance (Waddock and Graves 1997; Mahoney and Thorne 2005). Johnson and Greening (1999) and Mahoney and Thorne (2005) found a significant positive association between sustainability performance and an executive's long-term pay (measured by the equity base compensation). Although, their method was sufficiently rigorous to study sustainability performance and the executives' compensation components, Mahoney and Thorne (2005) encouraged researchers to apply more rigorous empirical models to generalize their findings. Of additional importance are the executives' pay, the executives' pay compared with the pay of the non-executive employees, and the employees' behavior regarding their pay and its effect on the firm's performance (Faleye et al. 2013).

I contribute to the research by following a systematic approach in which I first consider the internal factors that determine the pay ratio. I then investigate the effect of the pay ratio on the sustainability performance in two ways: between the CEO and the non-executive employees; and between the VPs and the non-executive employees. Among other factors, the tournament incentives of the pay ratio is a motivation for an increase in operational performance. Measuring this performance is mostly because of management discretion over the financial statement factors, including the revenue and expense measurements and disclosure. However, the derivational effect of a large pay gap will mean low employee efforts in the non-financial dimension of the organization (Crosby 1984; Martin and Murnighan 1981). Further, a 40-country survey provided evidence that people with varying demographic profiles (including age, education, and political beliefs) demand a smaller pay ratio between the executive managers and the non-executive employees than currently exists (Kiatpongsan and Norton 2014).

Social psychology researchers postulate deprivation and equity theories to assert the behavioral consequences of the resentment, anger, dissatisfaction, and emotional effects of unequal pay on the employees in different positions in a firm (Crosby and Gonzalez-Intal 2012). Relying on deprivation and equity theories, Cowherd and Levine (1992) consider the gap between executive and non-executive pay. Their integrated model illustrates that high pay ratios influence the non-executive employees' commitment to the firms' goals, their effort, and cooperation in a negative manner, which in turn might lead to a diminished product quality and a negative relationship with the firms' stakeholders. Moreover, the firms with high sustainability levels and with high productivity arising from high employee skill levels, share their operational performance among all of the employees rather than allocating the benefits merely to the top executives. Highly sustainable firms are expected to have high community values (as opposed to individual values). Consequently, I expect a negative relationship between the pay ratio and the sustainability performance.

H2: A high pay ratio is consistent with low sustainability performance after controlling for management structure, firm structure, risk, and financial performance.

Management structure

I study the association between the pay ratio and the sustainability performance after considering 1) the management structure, such as the ratio of females at the executive level and the dual responsibility (management and board) of the CEOs and the VPs, and 2) the firm structure such as the book-to-market ratio (growth opportunity), the firm size, the current ratio, the capital expenditure ratio, and the leverage.

Female Ratio. The management style of men and women differs because of differences in problem solving and perceptual vision (Perryman et al. 2016) and in risk preferences and attitudes that affect the financial performance of firms (Charness and Gneezy 2012). Some

studies use the female ratio as a proxy of diversity at board/management level (Hansen et al. 2006). There is evidence of the benefits of diversity at different levels of the organization (Hansen et al. 2006). One benefit is that gender diversity in the workforce results in higher sales revenues, more customers, and greater profits than for a workforce without gender diversity (Herring 2009). Female executives get lower compensation compared with their male counterparts, which reduces the pay ratio for the firms with many female executives (Carter et al. 2014). The difference in behaviour between female and male executives affects firm performance. For example, Bernasek and Shwiff (2001) argue that female executives are more risk averse in their pay negotiations than their male counterparts, which means that a firm with a high female ratio at the executive level has a lower level of executive pay and a lower pay ratio than a firm with mostly male executives. The other possible reason for the low pay ratio in a gender-diverse management team is the influence of negotiation, because female executives tend to negotiate less than their male counterparts. Following their own sustainable management style, female executives provide high sustainability performance levels. In their case study, (Carter et al. 2014) took an institutional approach and showed that women influence more responsible and ethical decisions than men do. Moreover, Landry et al. (2014) tested a large number of ethical firms over the period 2006–2012 and found that there were high numbers of female directors for these firms. These studies imply that a gender-diversified management team and board of directors are responsive to a high sustainability performance (Glass et al. 2015). Additionally, because of their risk tolerances, female CEOs (or a high female ratio at the executive level) follow different investment planning strategies than do their male counterparts.

Following these studies, I control for gender diversity at the executive management level (measured by the ratio of the female managers to the total number of the executive managers) as

an effective factor of sustainability (Vieito and Khan 2012) and expect to find a negative effect between the female ratio and the pay ratio.

Dual Responsibility. Jo and Harjoto (2012) indicate that a CEO with a dual responsibility of executive manager and of board member—especially chair of the board—increases the CEO's pay because of the CEO's entrenchment at the board level. Fosberg (2011) suggest that dual management responsibility is beneficial for firms' performance. However, other studies provide evidence of a significant negative association between the executives' dual responsibility and the firms' performance (Semenova and Savchenko 2015). Executive managers without dual responsibility may lack interest in the firm's overall performance, which might not improve their personal wealth.

Firm structure and financial performance

Following previous compensation studies, I control for the financial performance and the firm structure by adding the firm's growth opportunity (book-value to market-value of equity), size, current ratio, capital expenditure, and leverage to my model (Faleye et al. 2013). I use the natural logarithm of the total assets (Clarkson et al. 2015a) and the book-to-market ratio (calculated as the ratio of the book-value of the equity to the market-value of the equity) as the proxies for public financial risk (Faleye et al. 2013) and firm growth opportunities (Adam and Goyal 2008), respectively. Accordingly, I control for the executives' dual responsibility as an effective factor in determining the relationship between the pay ratio and the sustainability performance.

Section 3: Methodology

Sample and data collection

I obtained the executives' compensation data from the S&P ExecuComp database. The ExecuComp database contains the executive compensation data for the firms listed in the S&P 1500[6] since 1992. The data available reflected the most recent reporting requirement of the FAS123R in DEF14A[7] form. Effective since 2006, the new reporting regime requires that the cost of all of the employee stock options and equity-based compensation arrangements are reported based on the estimated fair value of the awards. I define a CEO as the person identified as holding the title of chief executive officer of the firm in the ExecuComp database (CEOANN=CEO), and classify the other executives as vice presidents (VPs). I analyzed only those companies with disclosed compensation. I obtained the firms' sustainability ratings from the KLD database and the financial data from the Compustat database. There is no mandatory disclosure of non-executive employee compensation; hence, my sample was limited to the firms with executive compensation disclosed in ExecuComp and that voluntarily disclose their non-executive employee compensation data in Compustat (XLR=Staff Expense-Total).

In the six-year sample period (2008–2013), ExecuComp included 2,101 firms, covering 10,350 observations. By matching the ExecuComp compensation data with the sustainability ratings from KLD and the financial data from Compustat, the sample was reduced to 1,152 observations, composed of 268 unique firms from 19 industry groups. This introduced potential self-selection issues, which I examined by comparing the sample with the population of

[6] Made by Standard & Poor's, the S&P 1500, or S&P Composite 1500 Index is a stock market index of US stocks, which was launched in 1995. This index includes all stocks in S&P500, S&P 400, and S&P 600 and it covers 90 percent of the market capitalization of the US stocks

[7] Governed by United States Securities and Exchange Commission section14-a, in accordance with the FAS 123R governed by companies are required to report the impact of the equity rewards in their financial statements.

ExecuComp firms (Table 1). The industry distribution of my sample firms was reasonably similar to that of the ExecuComp universe.

"Insert Table 3.1 about here"

On average, the sample firms were larger than the Compustat firms, with average revenues of $11.53 billion and $4.77 billion, respectively. However, the revenue per employee was roughly similar ($753,000 per employee in my sample compared with $730,000 per employee in Compustat).

In the sample, the average CEO current compensation was $1.19 million, and the average CEO total compensation at granted value was $8.54 million. Regarding the combined compensation for all of the VPs in a firm, the average current compensation was $3.25 million, and the average total compensation was $15.82 million. In comparison to the executives' compensation, the average payment to the non-executive employees was $22,000 per year. In the sample, the annual current compensation of the CEOs was 902 times the average annual compensation of the non-executive employees, and the annual current compensation of the VPs was 507 times that of the non-executive employees.

The data contained some outlier observations because I found a difference between the minimum and maximum values before and after winsorizing the data. Thus, following the recommended data analysis techniques (Bartov et al. 2000), I used the natural logarithms of these ratios in my analysis after winsorizing all of the pay ratios at the 1st and 99th percentiles to minimize the effects of any potential outliers (Table 2).

"Insert Table 3.2 about here"

I obtained the sustainability performance rating from an MSCI database. The MSCI rating model included over 60 sustainability indicators in seven categories for three broad pillars: 1) environment, 2) social (including community, human rights, employee relations, diversity, and products), and 3) governance. MSCI used a binary representation (meet/not meet criteria coded as 1/0) to determine the sustainability ratings. The ratings within each broad category were divided into two sets of indicators measuring the strengths (best practice) and the concerns (serious challenge).

The ratings in the environment, social, and governance categories were calculated as the difference between the strengths and the concerns. To resolve the problem of the rating endogeneity with the other independent variables (which is because of the overlap of the MSCI governance ratings with the applied governance structure variables in my model), I used the environmental rating as the proxy for sustainability performance. I performed a further analysis, by testing my model with the environmental strengths and environmental concerns as dependent variables in the second stage.

The average of the environmental ratings, environmental strengths, and environmental concerns in my sample were 0.08, 0.63, and 0.55 respectively. Overall, the environmental rating had a maximum (minimum) value of 4 (-4) while the environmental concerns and environmental strengths had a maximum (minimum) value of 5 (0) and 4 (0), respectively.

The average revenue per employee after winsorizing at the 1st and 99th percentiles was $690,000. The R&D expenditure ratio to the total revenue was 3 percent, and the net property plant and equipment per employee was $370,000. The firms in my sample had average book values to market-values of 0.49, and a size (log of total assets) of 23.13. For each dollar amount of current liability the current asset was $1.94 (current ratio 1.94:1). The capital expenditure ratio

to the total revenue was 7 percent, and total debt was $0.61 per each dollar of the total assets (Table 3). On average, 8 percent of the total VPs were female, 12 percent of the VPs also had a board responsibility, and 96 percent of the CEOs served at the board level (Table 3).

"Insert Table 3.3 about here"

Table 4 presents the pairwise correlation coefficients. The pay ratios at each level had strong significant negative correlations with the environmental rating and the environmental strengths. The higher the pay ratio, the lower the total environmental score and the environmental strengths ratings. In contrast, the correlations between the pay ratios and the environmental concerns were moderately positive. There were positive strong correlations between the determinants of the pay ratios, operating performance, R&D intensity, and physical capital intensity. E.g., the pay ratio, at each level and measurement, had negative significant correlations with the environmental strengths ($r= -0.1$, $p=0.00$) and positive weak correlations with the environmental concerns ($r=0.04$, $p<0.1$),

While there was a significant correlation between the dependent and the independent variables, none of the Pearson correlations coefficients were higher than 20 percent, which lessens the multicollinearity concern between the variables.

"Insert Table 3.4 about here"

Variables

Dependent Variables

1- Pay ratio

I studied the pay ratio between the executives and the non-executive employees. I compared the CEO compensation with the average pay to the non-executive employees, and the average VP compensation with the average pay to the non-executive employees. For each group, I analyzed two compensation sets: 1) current compensation and 2) total compensation. In the first stage of the analysis, I tested four models (A, B, C, and D) with the following dependent variables.

CEO (VPs) pay/non-executive employee pay

The pay ratio variable was an endogenous independent variable measured as follows.

Model A and Model C. Current: The ratio of the CEO (VPs) short-term average compensation (including salary and bonuses) to the average pay of the non-executive employees.

Model B and Model D. Total: The ratio of the CEO (VPs) total average compensation to the average pay of the non-executive employees. The CEO (VPs) total average compensation was comprised of their salaries and bonuses and the total value of the restricted stock granted, the total value of the stock options granted (using Black-Scholes), the long-term incentive payouts, and all other payments. The average compensation of the non-executive employees was the total staff expenses divided by the total number of employees.

2 - Sustainability Performance

Following Mahoney and Thorne (2005), I restricted my study to the environmental dimension and measured the sustainability performance by the environment ratings of the firms. Based on the measurement methodology, the two components included in the environmental strengths and concerns captured specific firm capabilities. The environmental strengths measured the proactive environmental activities (e.g., beneficial products and services, pollution

prevention, recycling, clean energy, and pollution prevention production approaches), whereas the concerns were the reactive detrimental environmental practices (e.g., hazardous waste, regulatory problems, ozone depleting chemicals, substantial emissions, agricultural chemicals, and climate change) (Walls et al. 2012). To improve the rigor of the hypothesis testing, I performed a sensitivity analysis by testing the two components (strengths and weaknesses) independently.

Independent Variables

Operating performance

Fundamentally, employees are paid for their actual financial outcome. Thus, the operating performance was used as the main determinant of the pay ratio. Moreover, the executive compensation packages are tied to the firm's financial performance (Core et al. 1999). A high operating performance level (as the measure of the firm's financial performance) is associated with a high executive pay level, which leads to a large pay ratio. The operating performance is defined as the operating income after depreciation over the total number of employees.

R&D Intensity

Faleye et al. (2013) argued that the firms that invest in R&D need highly skilled managers to increase their innovative operations. Following this argument, I represented the managers' skill by the R&D intensity, which is the ratio of the R&D expenditures to total assets. I expected a positive association between the R&D intensity and the pay ratio, which means the higher the executives' skills, the higher will be the pay ratio (Goldin and Katz 1996; Parrino 1997).

Physical Capital Intensity

The firm level variable—physical capital intensity—is defined as the ratio of the net property, plant, and equipment to the number of employees. This implies that capital-intensive operations require higher skilled employees either at the management level or at the organization

level than operations that are not capital intensive. The high skills requirement will increase the bargaining power of the management and thus increase the compensation of the executives. The firms are sensitive to the executives' high management skill levels and increase their pay in comparison with the non-executives. Thus, there is a positive association between the pay ratio and the physical capital intensity.

The R&D intensity and the capital intensity are both defined at the firm level (Faleye et al. 2013), and they are proxies for human capital at the management level (Goldin and Katz 1996; Parrino 1997). Increases in R&D and capital intensities lead to a better financial performance and hence to a higher bargaining power of the executives', which leads to higher compensation. The assumption is that although the human capital mostly resides in the non-executive employees, the executives' reap the benefits of these increased skills due to their higher bargaining power compared with the non-executive employees.

Control Variables

Firm structure controls

The pay ratio and the sustainability performance are affected by the firm's risk and the financial performance. The book-to-market ratio is a proxy for the measurement of the firms' risk in the public market because it affects the relationship between financial risk and capital structure (Peterkort and Nielsen 2005). I controlled for the firm's risk and market growth by including the book-value of the equity over the market-value of the equity (Faleye et al. 2013)

I also controlled for the current ratio (measured by the current assets over the current liabilities), the firm's size (natural logarithm of the total assets), the leverage (total debt to total

equity), and the capital expenditure ratio (the capital expenditure from the cash flow[8] to the total revenue).

Management structure.

Researchers have studied the pay ratio and the sustainability performance by focusing on the different executive manager structures, including gender diversity and the dual responsibility of the CEO and the VPs at the management and board level (Callan and Thomas 2011). Considering the differences in male and female attitudes, researchers study the effect of gender diversity on a firm's sustainability performance (del Mar Alonso-Almeida et al. 2015) and on the compensation packages. I addressed the gender issue by adding the female ratio (number of female VPs to total number of VPs), as a management control in both stages of the analysis.

I also controlled for the dual responsibility of the CEOs and the VPs at firm level by adding the executive dual responsibility (VPs who serve on the board over total number of the VPs) and the CEO on the board (1 if the CEO is on the board, 0 otherwise). I distinguished the dual responsibility of the CEO by a dummy variable, and the dual responsibility of the VPs by the ratio of the executives that serve on the board to the total number of the VPs. I also controlled for the industry by adding the dummy variables for the industry group based on the two-digit North American Industrial Classification System (NAICS)[9], and controlled for the year fixed effects to accommodate the observed trend in increasing pay ratio and sustainability performance over time. Moreover, I reduced the problem of similar organization data over the year by applying the cluster analysis at the firm level, grouping the data from the same firm in one cluster. I grouped the data by the firm in one cluster to partition the data into groups based on their similarity, with the assumption that over the six-year period the firms' structure and performance do not

[8] The funds used for additions to property, plant, and equipment, excluding amounts arising from acquisitions.
[9] NAICS classifies establishments by their economic activity.

significantly change. The main advantage of the clustering (classification) is that the data are adaptable to changes and the clustering identifies the features that distinguish the firms (Thompson 2011).

Model

By applying the two-stage least square (2SLS) model, I addressed the endogeneity of the employees' operational performance and the employees' skills with the executive-employees' pay ratio (stage one). I regressed the pay ratio on the employees' performance and employees' skills along with the executives' structure (the female ratio at the executive level; and the dual responsibility of CEO and other VPs as the executive managers and board members). After controlling for the firms' structure, I predicted the pay ratio. In the second stage, I regressed the predicted pay ratio on the sustainability performance after controlling for the management structure and the firm structure. Figure 1 shows the 2SLS model used.

"Insert figure 3.1 about here"

The first stage of the regression indicated that the employees' operating performance and skills were associated with the pay ratio. In the second stage, I tested the association between the pay ratio and the environmental performance. The applied 2SLS model is described below.

The first stage predicted the residuals from the regression of the employees' performance and the employees' skills on the pay ratio, either between the CEO and the non-executive employees or between the VPs and the non-executive employees. In the second stage, I tested the effect of the predicted pay ratio (from the first stage) on the sustainability performance (second stage). In both stages, I controlled for the executive's structure and the firms' financial performance and structure, which are defined in the matrices: 1) management structure and 2) firm structural control.

First stage:

$$Pay\ Ratio_i =$$

$$\beta 0 + \beta 1 \mathrm{OperatingPerformance_i} + \beta 2\ \mathrm{R\&DInt_i} + \beta 3\ \mathrm{PhysicalCap\ int_i}$$

$$+\ \mathrm{Management\ Structure} + \mathrm{Firm\ Structure} + \mathrm{u_i}$$

Second stage:

$$SustainabilityPerf_i =$$

$$\alpha 0 + \alpha 1 Pay\ Ratio_i + Management\ Structure + Firm\ Structure + v_i$$

In which:

$$Management\ Structure = \begin{bmatrix} Female\ Ratio_i \\ VP\ Duality_i \\ CEO\ Duality_i \end{bmatrix} \qquad Firm\ Structure = \begin{bmatrix} Book/Market_i \\ Size_i \\ Current\ Ratio_i \\ Capx\ Ratio_i \\ Leverage_i \end{bmatrix}$$

The sustainability data were collected from the MSCI ESG Stats, whose ranking system included over 60 indicators in seven categories of the environment, social (including community, human rights, employees, diversity, and customers), and governance pillars. That ranking system used a binary representation (1 if they meet the criteria, otherwise 0).

I defined two sets of dependent variables. The pay ratios were measured by the current and the total compensation of the executives at two levels: CEOs and VPs. Thus, I tested the model with four dependent variables in the second stage: A) CEO/Employee (Current), B) CEO/Employee (Total), C) VP/Employee (Current), and D) VP/Employee (Total).

The dependent variable in the second stage was the sustainability performance (SustainabilityPerf). By controlling for the management structure, which included some of the governance variables, I distinguished between the three dimensions of the sustainability performance and tested my model with environmental performance. The environmental performance is the difference between the total sum of environmental concerns and the total sum of environmental strengths. These two components capture specific firm capabilities. Environmental strengths are the strategic capabilities that enable firms to proactively surpass the regulation requirements to further improve their environmental activities (e.g., pollution prevention approaches). Environmental concerns are indications of the reactive and detrimental environmental practices and capture the pollution level fairly well (e.g., regulatory problems) (Walls et al. 2012). Thus, I tested the model separately with each component.

Section 4: Results

Pay ratio determinants

Table 5 gives the analysis results, using the pay ratio determinants for CEO/non-executive employee pay (Table 5-1: columns A and B) and for VPs/non-executive employee pay (Table 5-1: columns C and D).

I expected the pay ratio to increase with the employees' productivity and with the operating complexity. I expected the ratio to decline with the executives' gender diversity and to increase with the dual responsibility of the executive managers (as managers and as board members). Moreover, following Faleye et al. (2013), I used the book-to-market value of the firm as a proxy for the growth opportunity, and the natural log of total assets as a proxy for firm size.

The results of the first step of the analysis suggest that the observed pay ratios (CEO/non-executive employee pay and VPs/non-executive employee pay) and the operating performance

measured by the revenue per employee are positive. Consistent with the bargaining power hypothesis, a better operating performance increases the bargaining power of the CEOs and the VPs. The coefficients imply that an increase of one standard deviation in operating performance is associated with an increase of 53 percent (β= 0.47, p=0.00) in the in CEO/non-executive employee current pay ratio; of 81 percent (β= 0.65, p=0.00) in the CEO/non-executive employee total pay ratio; of 61 percent (β= 0.52, p=0.00) in the VPs/non-executive employee current pay ratio; and of 73 percent (β= 0.60, p=0.00) in the VPs/non-executive employee total pay ratio.

Additionally, the physical capital intensity increases the bargaining power of the CEO and the VPs toward the board of directors. An increase in the value of the property, plant, and equipment per employee is associated with a 25 percent (β= 0.23, p=0.00) increase in the current pay ratio between the CEO/non-executive employees; a 30 percent (β= 0.47, p=0.00) increase in the total pay ratio between the CEO/non-executive employees; a 27 percent (β= 0.19, p=0.00) increase in the current pay ratio between the VPs/non-executive employees; and a 24 percent (β= 0.21, p=0.00) increase in the total pay ratio between the VPs/non-executive employees.

An increase in the diversity at the executive management level, measured by the percentage of female executives to the total number of executives, reduces the pay ratio. An increase in the female ratio at the executive level is associated with a 51 percent (β= -0.50, p<0.1) decrease in the current pay ratio between the CEO/non-executive employees; a 53 percent (β= -0.56, p<0.1) decrease in the total pay ratio between the CEO/non-executive employees; a 49 percent (β= -0.68, p<0.01) decrease in the current pay ratio between the VPs/non-executive employees; and a 46 percent (β= -0.62, p<0.01) decrease in the total pay ratio between the VPs/non-executive employees. However, this variable is only moderately significant in determining the pay ratio. Contrary to my expectation; the dual responsibility of the CEO at the board level reduces the pay ratio between the CEO (VPs) and the non-executive employees. The dual responsibility of VPs

reduces the CEO/non-executive employee pay ratio, while it increases the VPs/non-executive employee pay ratio.

Finally, the larger firms and the firms that have high debt levels in their capital structure have a lower pay discrepancy between their executive and non-executive employees.

"Insert Table 3.5.1 about here"

Pay ratio and sustainability performance

The main objective of this study is to investigate the effect of the compensation to the executives compared with the average annual pay to the non-executive employees and to then compare that relationship to sustainability performance. To test the relationship, I considered the endogeneity of the pay ratio. In the second analysis stage, I estimated the regression of the natural logarithm of the pay ratio on environmental performance. In each regression, I also included the year and the two-digit NAICS code industry fixed effects and adjusted the errors by clustering the observations at the firm level.

Several of my findings support behavioral theories. A high pay ratio, from either a high executive compensation or a low average pay to the non-executive employees, is associated with a low sustainability performance. An increase in the deviation of the pay ratio between the executives (CEO and VPs) and the non-executives is associated with decreases in the sustainability performance of 37 percent (CEO/non-executive current: β= -0.16, p=0.00); 29 percent (CEO/non-executive total: β= -0.32, p=0.00); 36 percent (VP/non-executive current: β= -0.44, p=0.00); and 31 percent (VP/non-executive total: β= -0.37, p=0.00). An increase in the female ratio is associated with a higher sustainability performance level.

"Insert Table 3.5.2 about here"

I conducted two sets of regressions using environmental strengths and environmental concerns with the same control variables in the second stage models (Tables 6 and 7 only show results from the second stage). The individual tests for sustainability performance components, for environmental strength, and for environmental concerns, illustrate that the pay ratio (at each level) is significantly related to the environmental strengths and is weakly significant to the environmental concerns. The regression results indicate that a low pay ratio is associated with environmental strengths (concerns) by 51–63 percent (35–47 percent). Moreover, an increase in the female ratio at the executive level is moderately significant in association with environmental strengths and not significant in association with environmental concerns.

"Insert table 3.6 and 3.7 about here"

Section 5: Discussion and conclusions

Both business and academic analysts are interested in the pay ratio between top executives and non-executive employees. In society, there are debates about pay inequalities where executive managers are paid many times what non-executive employees are paid. However, agency theory suggests that pay inequality can be an incentive for improving performance in organizations. I discussed the determinants of the pay ratio between the CEO (VPs) and the non-executive employees. I categorized these determinants into three groups: operational performance, management structure, and firm structure and financial performance. Then, I investigated the direction and the magnitude effect of these factors on the pay ratio between CEOs and non-executive employees as well as between VPs and non-executive employees. The results support the hypothesis that the more bargaining power the executives have toward the board—regarding the operational performance factors (revenue per employees and complexity of operations)—the higher is the pay ratio between the executives and non-executive employees.

Further, an increase in the female ratio of executives reduces the pay ratio between the executives and the non-executive employees.

While improvements in operational performance increase the bargaining power of the executives and improve their compensation, the effect of an unequal payment can be observed in sustainability performance measured by the firms' environmental ratings (including the environmental strengths and concerns). These results support behavioral agency theory, which implies that a high monetary incentive at the management level can result in employees shirking and thus lower the firms' performance for the non-financial dimensions (environmental). This outcome can be because of a low level of attention and contribution from the non-executive employees who are not directly involved in the sustainable projects, or because of their lack of knowledge and training about sustainable activities and their long-term effect on society, the environment, and the community (Paillé et al. 2014). Additionally, the more sustainable firms have values that are consistent with community interests rather than individual interests. Therefore, these firms are willing to create compensation packages that reward all of the employees in the corporate community based on their financial, environmental, and social performance, rather than just rewarding the executives for financial performance. I intend to extend this research to analyze that issue.

Those who set regulatory standards, board members, and executive managers might be the stakeholders who are mostly interested in considering the results of my study in their decision making about disclosure requirements (e.g., the Dodd-Frank Act[10] and the US Securities and Exchange Commission requirements on executive compensation details and on the ratio for

[10] Signed into federal law in 2010, **Dodd–Frank Wall Street Reform and Consumer Protection Act** (Pub.L. 111–203, H.R. 4173) brought significant changes to financial regulatory environment and affected all federal financial regulatory agencies and financial services industries.

executive compensation to the median or average paid to the other employees). The results of my study are also of interest in contract setting with employees at the management level or at lower levels of the organization. It can be a warning that the monetary incentives at the executive level can be disincentives at the organization level among the non-executive employees. Additionally, the lower the pay ratio between the executive managers and the non-executive employees, the more the firm's values are consistent with high sustainable values.

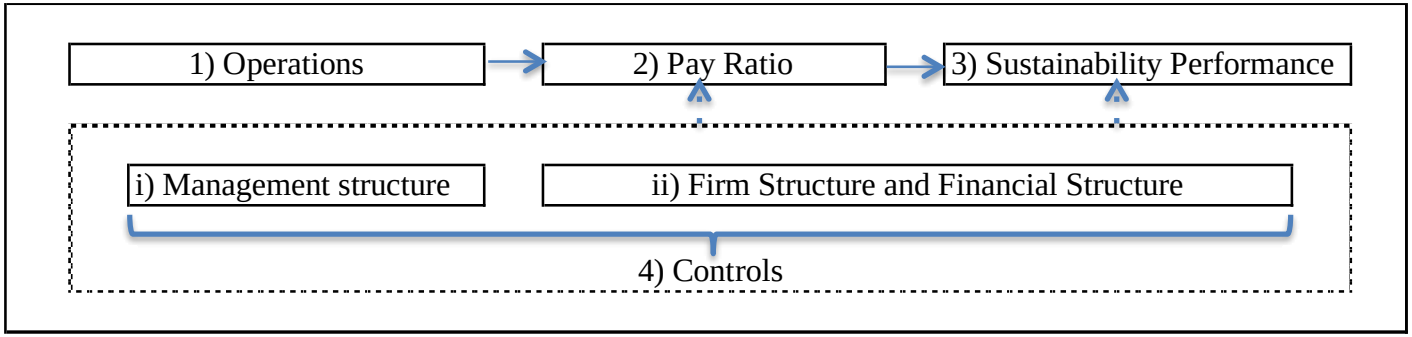
I also find support for the association of the female ratio at management level with an organization's environmental performance. The different risk tolerance and management style of the female executives compared with their male counterparts, potentially means that the female ratio at the executive management level has a significant association with the pay ratio and the environmental performance. A higher female executive ratio is associated with a lower pay ratio, which, based on previous studies (Hill et al. 2015), might be an indication of the risk aversion of the female executives in their pay in comparison to the male executives, or of their willingness to share the profits among all of the employees. An increase in the female ratio is associated with higher environmental performance levels, which might be because of a higher standard of ethical decision making by the female executives. Moreover, because of their unique capabilities and characteristics, the female executive managers have been considered rare, inimitable resources that provide a high sustainability performance rating for the firm (Kabue and Kilika 2016).

Previous studies provide evidence that the pay discrepancy at a meaningfully high level of pay or at meaningfully equal payments is possible (the existence of a curve linear relationship between the sustainability performance and the pay ratio). I did not investigate that issue; however, a possible extension of this study is to test the differences in the sustainability performance at different levels of the pay ratio. Moreover, this research can be improved by considering other compensation packages; e.g., the compensations that are linked to the

sustainability performance, or the existence of profit-sharing plans in the more sustainable firms. This line of research can help the board members to design compensation packages that motivate higher performance in different dimensions relevant to the organization such as the environment. It can also be considered by the standard setters on what internal contract information (e.g., information on executive or lower rank employee compensation packages) should be available to the public investor.

Section 6: Appendix

Figure 3.1. Research model: Pay ratio determinants, pay ratio, and sustainability performance



1- Operations	2- Pay Ratio	3- Sustainability Performance
i) Performance (Revenue per Employee) ii) Complexity a. R&D Intensity b. Physical Capital Intensity	i) CEO-Other Employee (*) ii) VPs-Other Employees (*) * At each level two measurements for the pay ratio is considered: a. Current compensation b. Total Compensation	i) Environmental Performance a. Environmental strengths b. Environmental concerns
4- Controls		
i. Management structure a. Female Ratio b. VPs Duality c. CEO Duality	ii. Firm Structure and Financial Structure a. Growth Opportunity b. Size c. Current Ratio d. Leverage e. Capital Expenditure Ratio	

Table 3.1. Industry distribution of sample firms vs. database (ExecuComp and Compustat) firms

		% of Observations & firms				Average Environmental Strengths		Average Environmental Concerns		Revenue ($mil)		Revenue Per Employee ($000s)	
		Execucomp		Sample									
NAICS Code: Industry Description		% of Obs	% of firms	% of Obs	% of firms	KLD	Sample	KLD	Sample	Compustat	Sample	Compustat	Sample
11	Agriculture, Forestry, Fishing and Hunting	0.2	0.2	0.4	0.4	0.0	0.0	-0.4	0.0	5,240.9	12,478.8	498.8	464.0
21	Mining, Quarrying, and Oil and Gas Extraction	4.3	4.3	6.2	6.3	-0.1	0.0	0.0	-0.1	6,681.8	5,185.6	1,378.1	1,232.9
22	Utilities	4.2	3.9	1.6	1.1	0.0	0.0	0.4	0.0	6,147.6	10,115.3	989.0	1,065.3
23	Construction	1.6	1.4	0.8	0.8	0.0	0.0	-0.5	0.0	3,612.8	4,817.4	773.0	875.1
31	Manufacturing	39.0	38.7	33.1	32.1	0.2	0.0	0.2	0.1	6,612.9	10,053.6	517.9	606.2
42	Wholesale Trade	2.8	2.9	0.9	0.8	0.0	0.0	0.0	0.0	12,824.8	41,430.0	1,361.7	3,968.3
44	Retail Trade	5.8	6.0	7.4	5.6	0.1	0.0	0.2	0.0	16,467.0	18,436.7	314.4	429.3
48	Transportation and Warehousing	2.4	2.3	5.0	3.7	0.1	0.2	0.1	0.6	8,070.4	19,708.5	472.7	402.2
51	Information	8.2	8.7	10.9	10.8	0.1	0.0	0.1	0.0	6,161.3	6,478.7	378.5	517.9
52	Finance and Insurance	14.3	14.0	17.5	21.3	0.1	0.4	0.3	1.4	6,690.8	18,529.5	1,093.1	1,040.9
53	Real Estate and Rental and Leasing	5.4	4.9	5.5	6.3	0.0	0.0	0.0	0.0	1,070.0	2,329.7	2,602.9	1,343.5
54	Professional, Scientific, and Technical Services	4.2	4.6	3.0	3.4	0.1	0.0	0.1	0.4	3,385.0	5,528.4	230.6	203.6
56	Administrative and Support and Waste Management and Remediation Services	2.0	2.1	2.1	1.9	0.1	0.0	0.0	0.0	2,870.1	3,848.0	245.2	255.9
61	Educational Services	0.7	0.6	0.4	0.4	0.0	0.0	0.0	0.0	1,480.6	4,313.5	161.0	80.7
62	Health Care and Social Assistance	1.9	2.0	1.9	2.2	0.0	0.0	0.0	-0.2	4,043.1	12,377.1	177.1	233.0
71	Arts, Entertainment, and Recreation	0.3	0.3			0.0		0.1		1,953.9		414.2	0.0
72	Accommodation and Food Services	2.2	2.3	3.4	3.0	0.1	0.1	0.1	0.2	3,656.0	10,392.0	91.6	97.1
81	Other Services (except Public Administration)	0.3	0.3			0.0		0.0		1,128.7		111.2	
99	Unassigned	0.3	0.3			0.0		0.7		53,233.1		223.7	
	Total (Obs /Unique Firms)	**10,350**	**2,101**	**1,152**	**268**	**0.0**	**0.1**	**0.1**	**0.3**	**4,770.04**	**11,529.7**	**730.1**	**753.2**

Table 3.2. Compensation values ($000s) and pay ratios

# of Obs.	1,152							
Unique firms	268							
Compensation ($1000)	**Mean**	**Min**	**Max**	**Median**	**1%**	**25%**	**75%**	**95%**
CEO Current Pay	1,188.93	0.00	10,350.00	987.10	7.15	750.00	1,243.45	3,000.00
CEO Total Pay	8,542.96	0.00	52,404.12	6,936.68	419.77	3,984.71	11,144.36	21,368.80
VP Current Pay	3,251.45	227.19	39,116.68	2,494.68	857.99	1,974.06	3,425.53	7,274.71
VP Total Pay	15,814.90	725.63	160,780.80	12,124.73	2,814.94	8,275.15	18,749.87	42,070.82
Average Employee Pay	21.60	1.00	291.73	1.00	1.00	1.00	1.00	109.36
Pay Ratio								
A) CEO-Employee- (Current)	902.10	0.00	10,350.00	819.20	1.71	101.60	1,125.67	2,572.59
B) CEO-Employee- (Total)	6,632.68	0.00	52,404.12	5,218.79	15.62	956.20	9,269.96	19,689.58
C) VP-Employee- (Current)	507.10	1.24	9,779.17	484.93	3.65	281.15	636.50	1,179.93
D) VP-Employee- (Total)	2,558.11	5.95	32,156.15	2,150.08	10.25	835.39	3,312.04	7119.658

Compensation values: the CEO current compensation; the CEO total compensation at granted value; the VPs average current compensation; the VPs average total compensation at granted value; and the average payment to the lower rank employees.
Pay Ratios: A) CEO current compensation to the non-executive employee average compensation; B) CEO total compensation at granted value to the non-executive employee average compensation; C) VPs average current compensation to the non-executive employee average compensation; and D) VPs average total compensation at granted value to the non-executive employee average compensation.
Note: All of the variables are winsorized at the first and 99th percentiles.

Table 3.3. Sample summary

Dependent Variable		Mean	Min	Max	Median	1%	25%	75%	99%
D1	Environmental Performance	0.08	-4.00	4.00	0.00	-1.00	0.00	0.00	1.00
D2	Environmental Strengths	0.63	0.00	4.00	0.00	0.00	0.00	1.00	2.00
D3	Environmental Concerns	0.55	0.00	5.00	0.00	0.00	0.00	1.00	2.00
Instrumental Variable (log winsorized)									
M1	CEO-Employee- (Current)	5.81	1.03	8.41	6.71	1.03	4.62	7.03	7.85
M2	CEO-Employee- (Total)	7.71	2.33	10.10	8.56	2.75	6.86	9.13	9.89
M3	VP-Employee- (Current)	5.38	1.27	7.53	6.18	1.30	5.64	6.46	7.07
M4	VP-Employee- (Total)	6.91	2.06	9.10	7.67	2.33	6.73	8.11	8.87
Independent Variable									
Compensation Determinants									
I1	Operating Performance (Revenue /Employee)	0.69	0.02	7.16	0.41	0.04	0.27	0.81	6.44
I2	R&D Intensity	0.03	0.00	0.89	0.00	0.00	0.00	0.03	0.12
I3	Physical Capital Intensity (PPE Net/Employees)	0.37	0.00	10.00	0.06	0.00	0.03	0.13	2.24
Management Structure									
I4	Female Ratio	0.08	0.00	0.50	0.00	0.00	0.00	0.20	0.33
I5	Executive Duality (%)	0.12	0.00	1.00	0.00	0.00	0.00	0.25	0.50
I6	CEO Duality (0/1)	0.96	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Firm structure/Financial Controls									
I7	Book/Market Ratio	0.49	-1.06	3.61	0.39	-0.12	0.20	0.66	1.24
I8	Size [log (total Asset)]	23.13	19.17	28.51	22.91	20.34	22.10	24.02	25.83
I9	Current Ratio	1.94	0.00	85.40	1.48	0.00	0.98	2.37	5.06
I10	Capx Ratio (Capital Expenditure/revenue)	0.07	0.00	1.69	0.04	0.00	0.02	0.06	0.24
I11	Leverage (Debt/Asset)	0.61	0.00	1.58	0.60	0.11	0.43	0.79	0.95

Dependent, independent, and control variables applied in the endogenous regression: 1) environmental rating (KLD); 2) environmental strengths; 3) environmental concerns; 4) natural logarithm of the CEO current compensation to the lower rank employees' average compensation; 5) natural logarithm of the CEO total compensation (at granted value) to the lower rank employees' average compensation; 6) natural logarithm of the VPs average current compensation to the lower rank employees' average compensation; 7) natural logarithm of the VPs average total compensation (at granted value) to the lower rank employees' average compensation; 8) operating performance measured as revenue per employee; 9) R&D intensity measured as R&D expenditure over the total asset; 10) physical capital intensity measured as net property plant and equipment (PPE) per employee; 11) return on asset measured as operating income after depreciation over the average total assets at the end of the period; 12) book-value of the equity over the total market-value of the equity; 13) size of the assets natural logarithm; 14) current ratio measured as current asset to current liabilities; 15) capital expenditure ratio as the ratio of the cash flow capital expenditure over the total revenue; 16) leverage measured as the total-debt to the total-assets; 17) female ratio measured as the number of the female VPs (including the CEO) over the total number of the VPs; 18) ratio of the VPs on the board measured as the number of the VPs that are on the board over the total number of the VPs; and 19) dummy of the CEO on the board (1 if the CEO is on the board and 0 otherwise)

Table 3.4. Pearson correlation

		D1	D2	D3	M1	M2	M3	M4	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10
Dependent Variables																		
D1	Environmental Performance																	
D2	Environmental Strengths	0.42***																
D3	Environmental Concerns	-0.21***	0.79***															
Instrumental Variables																		
M1	CEO-Employee- (Current)	-0.25***	-0.11***	0.04*														
M2	CEO-Employee- (Total)	-0.24***	-0.1***	0.05*	0.93***													
M3	VP-Employee- (Current)	-0.25***	-0.11	0.05	0.93	0.9***												
M4	VP-Employee- (Total)	-0.24***	-0.1***	0.05*	0.89***	0.92***	0.96***											
Independent Variables																		
Compensation Determinants																		
I1	Operating Performance (Revenue /Employee)	-0.06*	0.01	0.05*	0.17***	0.24***	0.22***	0.25***										
I2	R&D Intensity	-0.08***	-0.03	0.02	0.15***	0.16***	0.16***	0.16***	-0.15***									
I3	Physical Capital Intensity (PPE Net/Employees)	-0.05*	-0.06*	-0.03	0.1***	0.09***	0.09***	0.09***	-0.14***	-0.1***								
Management Structure																		
I4	Female Ratio	0.16***	0.1***	-0.002	-0.06*	-0.06***	-0.06***	-0.06*	0.02	-0.06***	-0.02							
I5	Executive Duality (%)	-0.03	0.04	0.06***	0.02	-0.04	0.1***	0.09***	0.06***	-0.05*	0.02	-0.07***						
I6	CEO Duality (0/1)	0.03	-0.04	-0.06***	-0.12***	-0.09***	-0.11***	-0.09***	0.13***	0.05*	0.04*	-0.06***	-0.05***					
Financial Controls																		
I7	Book/Market Ratio	0.16***	0.07***	-0.03	-0.24***	-0.31***	-0.26***	-0.31***	-0.04	-0.18***	0.07***	0.07***	0.01	0.06***				
I8	Size [log (total Asset)]	0.27***	0.14***	-0.03	-0.41***	-0.38***	-0.43***	-0.39***	0.23***	-0.33***	0.002	0.06***	-0.1***	0.08***	0.43***			
I9	Current Ratio	-0.08***	-0.04	0.01	0.13***	0.13***	0.17***	0.18***	-0.08***	0.17***	-0.07***	-0.04	0.05*	-0.02	-0.08***	-0.25***		
I10	Capx Ratio (Capital Expenditure/revenue)	0.05*	0.12***	0.1***	-0.14***	-0.11***	-0.13***	-0.09***	0.16***	-0.11***	0.4***	-0.01	0.05*	0.07***	0.001	0.3***	-0.07***	
I11	Leverage (Debt/Asset)	0.13***	0.06*	-0.03	-0.26***	-0.28***	-0.33***	-0.34***	0.03	-0.28***	-0.02	0.02	-0.11***	0.03	0.07***	0.5***	-0.36***	0.07***

Table 3.5.1. Two stage least square model on determinants of pay ratio

Step 1

Dependent: Pay ratio	**A**[11]	**B**[12]	**C**[13]	**D**[14]
Operating Performance	0.47*** (7.36)	0.65*** (10.66)	0.52*** (9.87)	0.6*** (11)
R&D Intensity	0.02 (0.03)	0.51 (0.55)	0.35 (0.69)	0.47 (0.69)
Physical Capital Intensity (PPE Net/Employees)	0.23*** (3.01)	0.28*** (3.71)	0.24*** (4.68)	0.22*** (3.08)
Female Ratio	-0.5* (-1.46)	-0.56* (-1.62)	-0.5* (-1.66)	-0.43 (-1.37)
Executive Duality (%)	-0.2 (-0.63)	-0.95*** (-2.86)	0.54* (1.96)	0.42* (1.54)
CEO Duality (0/1)	-0.85*** (-6.52)	-0.77*** (-4.9)	-0.56*** (-5.25)	-0.49*** (-3.4)
Book/Market Ratio	0.09 (0.58)	-0.46*** (-2.86)	-0.12 (-0.82)	-0.51*** (-3.41)
Size [log (total Asset)]	-0.37*** (-5.71)	-0.31*** (-4.57)	-0.21*** (-3.21)	-0.22*** (-3.92)
Current Ratio	0.02 (0.97)	0.02 (1.03)	0.04*** (6.27)	0.04*** (6.53)
Capx Ratio (Capital Expenditure/revenue)	-0.4668 (-0.73)	-1.0529* (-1.68)	-0.0003*** (-3.02)	-0.3117 (-0.5)
Leverage (Debt/Asset)	0 (-0.01)	-0.66*** (-2.5)	-0.57*** (-2.92)	-1.01*** (-4.86)
Intercept	16.87*** (10.78)	17.74*** (11.14)	12*** (8.02)	14.14*** (10.6)
Industry Group Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
F (30, 1120)	108.33	130.11	56.09	84.28
R-squared	0.48	0.50	0.56	0.55

Step 1: Two stage least square (2SLS)
This table represents first stage of the 2SLS model of the regression of the pay ratio on its determinants. Column A and B are the CEO/non executive current pay ratio and the CEO/non executive total pay ratio, respectively. Column C and D are the VPs/non-executives current pay ratio and the VPs/non-executives total pay ratio, respectively.
The instruments in the first stage are the operating performance measured as revenue per employee; the R&D intensity measured as R&D expenditure over the total asset; the physical capital intensity measured as net PPE per employee; the return on asset measured as operating income after depreciation over the average total assets at the end of the period; the book-value of the equity over the total market-value of the equity; the size of the assets' natural logarithm; the current ratio measured as current asset to current liabilities; the capital expenditure ratio as the ratio of the cash flow capital expenditure over the total revenue; and the leverage measured as the total-debt to the total-assets. I controlled for the industry group and year by adding the dummy variable for each industry group (two-digit NAICS code) and a year dummy.

- *, **, and *** statistically significant at 10%, 5%, and 1%, respectively.
- Robust absolute values of t-statistics are in parentheses.

[11] A: Pay ratio (CEO/non executives—current pay)
[12] B: Pay ratio (CEO/non executives—total pay)
[13] C: Pay ratio (VPs/non executives—current pay)
[14] D: Pay ratio (VPS/non executives—total pay)

Table 3.5.2. Two Stage Least Square model on pay ratio and the environmental performance (Strengths minus Concerns)

Step 2

Dependent: Environmental Strengths minus Concerns	**A**	**B**	**C**	**D**
Pay ratio	-0.16*** (-2.77)	-0.12*** (-3.06)	-0.14*** (-2.61)	-0.13*** (-3.02)
Female Ratio	0.47*** (2.87)	0.48*** (2.95)	0.48*** (2.94)	0.49*** (3.04)
Executive Duality (%)	0.05 (0.39)	-0.03 (-0.25)	0.14 (1.35)	0.13 (1.38)
CEO Duality (0/1)	-0.04 (-1.1)	0.003 (0.09)	0.001 (0.04)	0.03 (0.81)
Book/Market Ratio	0.04 (0.44)	-0.03 (-0.25)	0.02 (0.17)	-0.04 (-0.36)
Size [log (total Asset)]	0.02 (0.92)	0.05* (1.73)	0.03 (1.12)	0.05* (1.91)
Current Ratio	-0.0001 (-0.03)	-0.0006 (-0.22)	0.002 (0.75)	0.0025 (1.02)
Capx Ratio (Capital Expenditure/revenue)	0.10091 (0.56)	0.035 (0.22)	0.002 (0.75)	0.0914 (0.55)
Leverage (Debt/Asset)	-0.04 (-0.41)	-0.12 (-1.26)	-0.12 (-1.23)	-0.17* (-1.74)
Intercept	0.66 (1.09)	0.08 (0.15)	0.12 (0.19)	-0.18 (-0.39)
Industry Group Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
R-squared	0.0355	0.1018	0.0873	0.1008

Table 3.6. Two Stage Least Square model on pay ratio and the environmental strengths

Step 2

Dependent: Environmental Strengths	A	B	C	D
Pay ratio	-0.99*** (-2.55)	-0.72*** (-2.55)	-0.89*** (-2.35)	-0.79*** (-2.59)
Female Ratio	2.26* (1.67)	2.33* (1.81)	2.34* (1.8)	2.42* (1.87)
Executive Duality (%)	0.29 (0.23)	-0.25 (-0.22)	0.82 (0.68)	0.75 (0.62)
CEO Duality (0/1)	-2.17*** (-3.13)	-1.89*** (-2.94)	-1.9*** (-2.99)	-1.73*** (-2.65)
Book/Market Ratio	-0.03 (-0.04)	-0.44 (-0.65)	-0.13 (-0.19)	-0.51 (-0.73)
Size [log (total Asset)]	0.61*** (2.84)	0.74*** (3.68)	0.64*** (3.88)	0.77*** (3.79)
Current Ratio	0.03 (0.77)	0.03 (0.7)	0.05 (1.13)	0.04 (1.15)
Capx Ratio (Capital Expenditure/revenue)	-0.00009 (-0.3)	-0.00004 (-0.15)	0.00006 (1.09)	0.00003 (0.1)
Leverage (Debt/Asset)	0.19 (0.22)	-0.29 (-0.34)	-0.03 (-0.24)	-0.62 (-0.69)
Constant	0.8 (0.13)	-2.67 (-0.52)	-1.86 (-0.36)	-3.79 (-0.81)
Industry Group Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
R-squared	0.1432	0.1747	0.0729	0.1827

Table 3.7. Two Stage Least Square model on pay ratio and the environmental concerns

Step 2

Dependent: Environmental Concerns	A	B	C	D
Pay ratio	-0.64* (-1.78)	-0.44* (-1.63)	-0.58* (-1.7)	-0.48* (-1.66)
Female Ratio	1.3 (0.99)	1.36 (1.08)	1.34 (1.05)	1.41 (1.11)
Executive Duality (%)	0.44 (0.37)	0.1 (0.09)	0.76 (0.64)	0.71 (0.61)
CEO Duality (0/1)	-2.09*** (-3.1)	-1.91*** (-2.96)	-1.92*** (-3)	-1.82*** (-2.78)
Book/Market Ratio	0.03 (0.04)	-0.23 (-0.38)	-0.07 (-0.11)	-0.27 (-0.44)
Size [log (total Asset)]	0.49*** (2.6)	0.57*** (3.18)	0.52*** (2.84)	0.59*** (3.23)
Current Ratio	0.04 (1.18)	0.04 (1.11)	0.05 (1.35)	0.05 (1.32)
Capx Ratio (Capital Expenditure/revenue)	-0.00007 (-0.25)	-0.00002 (-0.09)	0 (0)	0.00002 (0.08)
Leverage (Debt/Asset)	0.15 (0.19)	-0.14 (-0.17)	-0.16 (-0.2)	-0.34 (-0.4)
Constant	0.7 (0.13)	-1.78 (-0.38)	-1.14 (-0.24)	-2.44 (-0.56)
Industry Group Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
R-squared	0.1988	0.2188	0.2141	0.2211

Chapter Four: Study Three

How does CEO power affect sustainability performance? A study on the board heterogeneity of compensation committees, CEO power, and sustainability performance

Abstract

I study the determinants of CEO power, and the effect of CEO power and compensation committee diversity on sustainability performance. I find that CEO power is associated with the demographic structure of a firm's executives (including the CEO and the other executives' age and gender) and dual responsibility (executives' dependency on the board of directors). After controlling for firm ownership and internal factors, including financial performance, I determine short-term and long-term CEO power. I investigate whether predicted CEO power and the diversity of compensation committee members are associated with a firm's sustainability performance. I find that CEO power (short-term and long-term) is significantly associated with sustainability performance. Moreover, I find a weak but mostly positive association between compensation committee diversity and sustainability performance.

Section1: Introduction

A board of directors consists of a group of individuals who are the shareholders' representatives in an organization, and it makes decisions that affect the performance of the company. Specified in the NYSE Corporate Governance Guide (2014), board members are expected to establish an appropriate culture that ensures a strongly ethical performance within the organization. One of the ways that the board can affect a firm's performance is to appoint a Chief Executive Officer (CEO) as the head of the executives and to establish the executives' compensation. Executive pay packages should be designed to retain and incentivize professional and talented managers to provide a high level of service to the company. Among the members of the executive team, the CEO has been recognized as the most powerful member of an organization (Daily and Johnson 1997). It is the CEO that generally receives the highest share of the pay allocated to the executive team. Considering the significance of the CEO's functions in an organization and the responsibility of the board of directors in appointing and maintaining the CEO's performance, in this study I combine the two key aspects, namely CEO power and the effect of a board's structure, specifically board diversity. First, I investigate the determinants of CEO power. Second, I test the effect of CEO power and the level of diversity among compensation committee members on sustainability performance.

My study contributes to the sustainability literature in the following ways. First, the results of the study indicate that diversity in the compensation committee along with CEO power affect sustainability performance. Considering the importance of the short-term (salary and bonuses) and long-term (equity-based payment) components of compensation packages, I discuss how this relates to CEO power within an organization. Depending on the proportion of the CEO's current (equity-based) compensation allocated from the executive team's aggregate current (equity-

based) compensation, CEO power can be defined as either short-term or long-term. Previous studies provide evidence that executives will adjust their efforts based on their short-term and/or long-term benefits by applying various policies and/or preferring multiple investments with various risk and outcome levels (Aaron et al. 2015). While some studies suggest that equity-based compensation in executive pay packages should align the interests of executives with those of the shareholders (Jensen and Murphy 1990), others focus on cash-based compensation (Shen and Zhang 2013). The inconsistency in the literature regarding compensation packages and firm performance has been attributed to contingent factors that are associated with both compensation and performance and the complexity of the business environment (Ntim et al. 2015). Following the dominant studies in the field (Bai and Elyasiani 2013; Gil-Alana et al. 2011), I apply components of the compensation packages and distinguish between executive cash and equity-based compensation. Furthermore, I combine the compensation literature with the role of the CEO and that of other executives in a firm's sustainability performance by addressing CEO power, which is related to the level of pay in comparison with the executive team. I also contemplate other contingent factors that are associated with CEO power, financial performance, and sustainability performance.

While previous studies in this field have provided inconclusive evidence of the effect of board diversity on CEO power, I propose that a CEO's short-term and long-term power, measured by the CEO's current (equity-based) compensation as a proportion of the executive team's current aggregate (equity-based) compensation, have dissimilar effects on a firm's sustainability performance. Thus, the importance of executive compensation packages and the compensation arrangements (short-term salary and bonuses versus long-term incentives of equity-based pay) of executives are studied separately. I determine that the internal structure and

abilities of executives and firm performance are associated with short-term (long term) CEO power. I then study the effect of CEO power along with the diversity of the compensation committee on sustainability performance. By introducing multiple proxies of diversity among board members on the compensation committee, I find a significant positive (negative) association between long-term (short-term) CEO power and sustainability performance. However, diversity (for all dimensions) was not found to have a direct effect on CEO power.

Second, by measuring the diversity of the compensation committee and controlling for firm ownership structure, I find that short-term CEO power has a positive association with the CEO's age. In contrast, there is a negative association between a CEO's short-term power and the CEO's duality, executive dependency, and the female ratio at the executive level. This means the more executives (including the CEO) who serve on the board, the lower a CEO's short-term power. Furthermore, CEO power is also reduced as the number of female executives increases. However, among the executives' structural variables, only CEO age has a positive and significant association with a CEO power in the long term.

Third, I estimate six components of diversity among compensation committee members and create several diversity indices. While the diversity indices do not have a significant effect on CEO power, the group of indices along with CEO power has a significant effect on sustainability performance. CEO short-term (long-term) power has a significant positive (negative) association with sustainability performance. The assumption is that compensation committee members decide the executives' compensation (with final approval by the board of directors). The influential factors in their decision are the executives' structure (age, gender, skill, and performance), the firm's financial performance (revenue per employee), and complexity (research and development [R&D] intensity, physical capital intensity).

The effectiveness of the board's composition can be achieved via long-running themes such as executive pay arrangements (NYSE, 2014). One aspect of the board's composition is initiatives to promote board diversity, which has recently attracted major attention in both media and politics. The Canadian Board Diversity Council and Financial Reporting Council (FRC, 2014)[15] expanded the traditional definition of board diversity in their 2015 report card. Their established definition of board diversity includes industry experience, management experience, education, functional area of expertise, geography, age, gender, and ethnicity (2015). The Canadian Board Diversity Council believes that diversity at board level adds value to businesses. Moreover, the Securities and Exchange Commission chairman outlined a busy agenda with a range of initiatives that focus on board member diversity and executive compensation. Thus, new disclosures regarding board composition require more research on the effect of board member diversity and their decisions regarding executives, and whether it will add value not only to financial performance but also to the environmental and social aspects of the business.

Existing literature on board diversity and firm performance recommends that a more diversified board structure enhances a firm's environmental and social aspects (Ferrero-Ferrero et al. 2015; Harjoto et al. 2014, 2015). Rao and Tilt (2015) found that greater board diversity did not result in financial enhancement. However, they reported improvements in environmental and social performance. These associations possibly arose because board diversity improves the knowledge and values that help the board of directors in its decision-making process. Consequently, it improves management quality and leads to a better sustainable performance (Ferrero-Ferrero et al. 2015)

The advantages of diversity have been recognized as 1) better access to information and resources (Bebchuk and Weisbach 2012, 2010) and 2) more independence, which reduces

[15] A leading Canadian organization that promotes diversity on Canadian boards of directors.

pressure on managers and leads to better outcomes (Carter et al. 2003). However, there are other aspects of diversity that lead to inefficient decision making and lower efficiency including 1) internal conflict and dividedness, 2) higher coordination and communications costs (Van den Steen 2010), and 3) more disagreement and animosity, which lead to dissatisfaction (Wall and Nolan 1986).

Considering the effect of board diversity on firm performance, studies have shown concern regarding endogeneity, which stems from the effect of independent internal factors on performance or missing variables. The board can affect executive performance via three major observable tasks: 1) executive replacement (Gomulya and Boeker 2015), 2) executive compensation (Zhu and Westphal 2014), and/or 3) merger and acquisition (Kim and Starks 2016). A strong CEO, as the head of the executive team, (Finkelstein 1992) and the CEO's cooperation with the board of directors (Daily and Johnson 1997) are also important.

The focus of this study is on the second task listed above, compensation received by executives. Leading studies in this field consider executive compensation by developing the role and significance of managerial power and introduce the concept of CEO power. This is measured by the CEO's pay slice (Bebchuk et al. 2002), calculated as the fraction of the aggregate compensation of the top-five executive team captured by the CEO.

To investigate the importance of board diversity and its impact along with CEO power on a firm's sustainability performance, I use a two-step method with a system of endogenous equations. I distinguish between a CEO's short-term and long-term power, defined as the CEO's short-term pay slice, which is the proportion of the current compensation of the top five executive managers captured by the CEO, and a CEO's long-term pay slice, which is the proportion of the equity-based compensation of the top five executive managers including the

CEO. In the first step, I predict CEO power and the residual of CEO power (short-term and long-term), then in the second step, I regress the sustainability performance on the predicated CEO power, the structure of the compensation committee (i.e., diversity), and external factors to illustrate how these internal factors add value to a firm's sustainability (environmental and social) performance.

I find that CEO power (short-term and long-term) is associated with the demographic structure of the executives (including age, gender, CEO's and other executives' responsibilities within the management team and board of directors [their dependency on the board of directors]). Furthermore, I investigate whether the predicted CEO power along with the diversity of the compensation committee members is associated with a firm's sustainability performance. I find that CEO power (short-term and long-term) has a strong significant influence on sustainability performance. While a higher level of short-term power is associated with lower sustainability performance, higher long-term CEO power is associated with higher sustainability performance. The results can be justified by the rationale that an increase in the current pay of a CEO is seen as a personal benefit of the CEO, whereas equity-based compensation is an incentive for the top executives to work together to improve the firm's long-term sustainability performance, which includes financial performance.

I also find that the board diversity indices have weakly significant effects on sustainability performance. Diversity in both demographics and board tenure has a positive association with sustainability performance while experience diversity (measured by the ratio of business experience in the same industry) has a negative association. Considering the definition of this proxy (experience in the same industry), I conclude that greater diversity in experience (e.g.,

experience in areas outside of the present industry) can be considered a resource for firms to achieve a greater performance in sustainability.

I believe that the weak results could be the result of the measurement of the diversity or the interrelationship between several measurements. Thus, this study can be improved by expanding the data with more detailed diversity measurements in multiple years to shed more light on the effect of board diversity and CEO power on sustainability performance.

The remainder of the study is organized as follows. In section two, I discuss prior literature as well as gaps in the literature, provide the motivations for the research, and develop hypotheses. In section three, I explain the research design (sample selection, data, variables, descriptive statistics, and methodology). In section four, I review the empirical results, and in section five, I summarize the results and findings. Finally, sections six and seven include the appendices, which define the details of the variables and the methodology of the diversity measurements.

Section 2: Theoretical framework and hypotheses development

Determinants of CEO power

The board of directors has been recognized as the most influential decision-making body in an organization. Board members exert their power through the approval of the firm's policies and strategies. The general rule is that board members provide counsel to the executives but should not get involved in the day-to-day activities, which in turn are managed by the executives. Likewise, the executive managers have specified areas of responsibilities (e.g., finance, human resources) and at the top of the executive team, the CEO is responsible for implementing those initiatives that maintain the firm's operations (Walls and Berrone 2015). While in some firms the CEO is the key decision maker, in others, the decisions are grounded in agreement among the top

executives (Adams et al. 2005). Thus, the CEO can exert power over the executive team in their decision making, which is crucial in the firm's performance (financial or non-financial). However, what enables the CEO to exert power over the executive team is not sufficiently transparent (Walls and Berrone 2015). Finkelstein (1992) defined and measured four aspects of CEO power as structural, ownership, expert, and prestige power. As the highest authority in the executive team, the CEO has the legislative right to influence the decision making (Brass 1984), which is an indication of the CEO's structural power. Categorized as ownership power, the position of the CEO in the agent–principal relationship is another indication of his/her power. While the CEO is the agent and responsible for creating value for the principals (owners), the CEO's ownership position and/or the links to the owners will be considered as CEO ownership power (Zald 1969). The existence of managerial expertise, which provides abilities to the CEO to confront the business environment and networks, is another source of CEO expertise power (Yetton and Bottger 1982). Finally, the CEO's reputation, prestige, and/or status are further sources of the prestige power of the CEO (Meyer and Scott 1992).

There are multiple constructs that measure these aspects. Relying on the empirical guidance provided in Finkelstein (1992), Daily and Johnson (1997) examined the potential enablers of CEO power (short-term and long-term). The constructs of CEO power are based on the top executives' characteristics including their demographic specifications (age and gender), responsibilities, expertise, and operational performance. Moreover, in their seminal study, Bebchuk et al. (2002) followed optimal contract theories and studied executive compensation, which is the dominant tool of the extensiveness of CEO power. Optimal contracting theories imply that executives' compensation packages are designed to minimize the agency costs between executives (agents) and shareholders (principals) and to maximize the shareholders'

value. However, if the executives have the power to influence their own compensation, the approved compensation arrangements by board members deviate from the optimal level, which can result in excess payments to the CEO or other executives (Bebchuk et al. 2002). In another study, Bebchuk et al. (2011) suggested that the portion of executive compensation that goes to the CEO could be used as a proxy of CEO power. By focusing on firms' financial performance and financial structure, they showed that there is a relationship between a firm's value and CEO power. Expanding this line of research, I consider the endogeneity of CEO power and its association with the structure of the executive team and the firm, as well as financial performance.

Executive structure

Gender of CEO and female executive ratio. There is currently great interest in increasing the number of women holding executive and board positions in firms. Some European countries have sought to implement quotas to increase the number of women in high-level executive positions (Spiropoulos et al. 2013). However, Bell (2005) provides evidence that female executives earn less than their male counterparts. That study documents several important facts. First, using a dataset of the five highest ranking executives in a sample of publicly traded firms, she shows that top women executives are paid between 8% and 25% less than male executives, and that the lower compensation effect is statistically independent of a firm's characteristics (market valuation, employment), executive structure (age, tenure, and title), and industry. Generally, these characteristics influence compensation packages. To the extent that these executives are similar in their educational background and motivation, and that women executives may face hurdles (e.g., gender biases and cultural beliefs) that exceed those faced by men, it is unlikely this gap can be largely explained by unmeasured differences in human capital.

I view the female CEO and the increase in the female ratio at the executive level as human capital that stabilizes CEO payments, thus reduces the proportion of the executive compensation earned by CEOs (Zahra and Pearce 1989; Dezső and Ross 2008). Consequently, my first hypothesis regarding CEO power is:

H1(a): The existence of a female CEO and a higher ratio of female executives reduces CEO power.

Age of CEO and diversity in executive ages. To obtain an extensive understanding of the compensation packages offered to Canadian CEOs, Nulla (2013) investigated the relations between the managerial structure and executive compensation packages. As one of the relevant factors, age is positively correlated, though weak, with compensation (Datta and Iskandar Datta 2014). The justification is that older CEOs are more risk averse in their own compensation. Thus, CEOs demand higher pay to guarantee their position in the firm. This will lead to a higher CEO pay slice. Moreover, age diversity at the executive level is considered as cognitive diversity, which stems from the differences in preferences held by high-ranking executives (Miller et al. 1998). It allows for more creative, innovative decision making for the management team, leads to more strategic changes (Wiersema and Bantel 1992), and prevents CEOs from exerting too much power in the firm (Groysberg and Connolly 2013), thus effectively reducing CEO power.

Therefore, my hypotheses regarding executive age (as the other management structure) and CEO power are as follows:

H1(b): CEO age is the structural determinant of executive compensation packages. Older CEOs have more power to extract private benefits out of the compensation paid to executives.

H1(c): The age diversity of executives is the structural determinant of executive compensation packages. The more age diversified the executive group, the lower the CEO power.

CEO duality and executive dependency. Joseph et al. (2014) drew on the importance of executive interests, CEO power, and their opportunities in responding to external pressures (e.g., institutional or internal investors) in the formation of the organizational structure. Within the agency theory framework, a conflict of interest between the owners (principals) and management (agents) can be managed by aligning the managers' interests and goals with those of the owners (Tosi et al. 2000b). One of the control mechanisms is via CEO power, and whether the executives can affect their own pay via their responsibilities as an executive and board director (Tien et al. 2013).

On one hand, agency theory recognizes the dual responsibility of executives (board and management) as a deteriorating factor for an organization's value creation. On the other hand, Hoechle et al. (2012) suggested that the effect of board diversity depends upon governance factors such as the CEO's responsibilities on the board. "CEO only" boards, defined as a board of directors that have the CEO as the only insider on the board, are believed to be an indication of board independency. Studies in finance and management fields suggest that the CEO-only structure improves the CEO's power because the only internal decision maker who also has any effect on the board is the CEO, which means more power for the CEO (Adams et al. 2005).

In contrast to the agency theory, the stewardship theory (Donaldson and Davis 1991) and resource dependency theory (Boyd 1995) argue that CEO decision-making power is lower in firms that where CEOs have no dual responsibility. Thus, there are limitations in the control of the shareholders over the board of directors, and it reduces the firm's performance and the

returns to their shareholders (Vo 2010). Liu and Jiraporn (2010) controlled for the effect of CEO power on firm performance by adding CEO dual responsibility dummies with the CEO as the chairman of the board (dummy as 1) or as merely a board member (dummy as 0). They found a negative effect on the firm's performance. CEO duality is associated with lower firm performance, resulting from the board's lack of full decision-making power, as the CEO is the only executive who also has authority on the board. Moreover, Firth et al. (2014) describe CEO duality as a double edged sword. They asserted that in not-for-profit firms, CEO duality is negatively associated with financial performance because it provides CEOs with more power to serve their own benefits at the expense of stakeholder profit. In profitable firms, however, where CEO turnover is not beneficial to the financial performance, CEO duality reduces CEO turnover and improves financial performance. Moreover, as number of executives who serve on the board increases, the number of people with the authority to make decisions is higher, which means less power for the CEO (Boyd 1995).

Following these studies, I add to my model two effective factors of CEO power: CEO dual responsibility and the dependency of other executives, which is the ratio of executive members that serve on the board to the total number of executives. I propose the following hypotheses:

H1(d): CEO dual responsibility improves CEO power.

H1(e): A higher proportion of other executives with responsibilities on the board reduces CEO power.

Firm structure and financial performance

Board size is considered an important structural determinant in the distribution of power among top executives (Cheng 2008). From a legalistic perspective, board members contribute to a firm's performance by carrying out their legally mandated responsibilities without actual

interference in day-to-day activities (Zahra and Pearce 1989). One argument from the control perspective is that larger boards are easier to control, which implies higher CEO power (Jensen 1993). Thus, in these studies regarding CEO power and firm performance, board size has been considered an effective variable that should be controlled in this association.

Moreover, prior literature provides evidence of the influence of the firm's ownership structure on CEO power (Abernethy et al. 2015). Ownership concentration, measured by outside ownership (Shleifer and Vishny 1997), and the external monitoring of managers, measured by institutional ownership (Van Essen et al. 2012), are effective controls for firm performance and value creation (Bebchuk et al. 2011). Thus, I control for the percentage of insider ownership and the percentage of institutional ownership as determinants of CEO power and the firm's sustainability performance in both steps of the structural model.

I also capture the economic determinants of CEO power. Based on prior studies, I include two internal factors associated with CEO power (Faleye et al. 2013): physical capital intensity (net property, plant and equipment to total assets) as the proxy of the complexity of a firm's activities (Faleye et al. 2013; Bebchuk et al. 2011) and CEO skills, measured by R&D intensity (R&D expenses over total assets).

Following previous studies in the literature, I control for firm size, as it is a proxy for several possible omitted variables such as firm complexity (Faleye et al. 2013). I also control for a firm's risks by including the book-to-market value and the firm's performance measured by the current ratio, return on assets (ROA), the liability/asset ratio, and the market price per share.

CEO power and sustainability performance

A high payment to a CEO is considered to represent the CEO's ability to influence the board (Albrecht and Jhin 1978). As I discussed in the previous section, CEO power is the

outcome of the executive team's structure, firm ownership, firm complexity, and financial performance. The level of CEO power and how this influences a firm's value have been debated in the literature (Bebchuk et al. 2011).

The conflict resolution theory suggests that more powerful CEOs will exert their power to enhance a firm's sustainability performance (Jiraporn and Chintrakarn 2013). In this view, when the CEO is powerful, none of the stakeholders have enough power to change the CEO's position or affect any decisions. Thus, only the CEO engages in sustainable activities to remove the tension between various groups of stakeholders and bring real sustainable values to the business.

Moreover, Papenhausen and Parayitam (2015) addressed the competition between top executives to exert power on firms. Although this competition reduces CEO power, managers put more effort into improving the firm's performance. Following this line of research, I expect a negative relationship between CEO power and firm sustainability performance. Moreover, addressing the value maximization hypothesis and stakeholders' theory, Rekker et al. (2014) discussed that the potential reason for CEOs to engage in sustainable activities (that bring long-term value to the business) is that they are motivated by intrinsic values, accepting modest short-term payments to achieve long-term rewards. However, the theory holds up to a threshold of CEO power (Jiraporn and Chintrakarn 2013). When CEO power is below or equal to a certain level, it negatively affects a firm's sustainability performance because CEOs will only engage in investments that provide media exposure and publicity regarding their engagement in sustainable activities to improve their own reputations. Thus, I differentiate between CEO short-term power and long-term power. CEOs with short-term power engage in more opportunistic behavior and promote their own benefits at the cost of the long-term sustainability performance of the firm. However, more powerful CEOs sacrifice their short-term personal interests to achieve higher

long-term payments, and most likely promote various stakeholders benefits and make decisions that improve the sustainable performance of the firm. Thus, I propose the following hypotheses:

H2(a): CEO short-term power is negatively associated with sustainability performance.

H2(b): CEO long-term power is positively associated with sustainability performance.

Compensation committee diversity and sustainability performance

To analyze the effect of board diversity on sustainability performance, I categorize diversity into two broad streams: demographic diversity (i.e., gender, age, tenure) and experience diversity (i.e., the background experience of the compensation committee members).

Demographic Diversity[16]

Board members help to link the organization to its external environment. Thus, an effective external linkage is associated with larger boards. Accordingly, an acceptable large board size ensures a better connection to the external business environment and provides protection from external business disturbances (Hafsi and Turgut 2013). Moreover, Clarkson (1995) and Hillman et al. (2001) suggested that a large board improve a firm's social performance.

Albrecht and Jhin (1978) advocated that the board of directors along with CEO power affect the firm's performance. A review of corporate governance studies shows that there is evidence that not only board size but also the structure of the board including diversity in several aspects, along with CEO power, has an impact on firm performance. Because executive compensation is an indication of CEO power, compensation committee members decide on the level of CEO power (Daily and Johnson 1997). Spiropoulos et al. (2013) examined the interaction between the gender diversity of boards and the power of female CEOs, and firm performance to influence a firm's strategic changes. The results of their study supported a three-way relationship indicating that in firms with higher than average performance, female CEOs

[16] The demographic variables are gender, age, and tenure diversity.

have greater power in comparison to firms that have male CEOs. Moreover, they showed that there is a significant positive relationship between a board's gender diversity and the firm's strategic change. However, in firms with a poor financial performance and a powerful female CEO, a negative relationship exists between the board's gender diversity and the amount of strategic change. Firms apply different strategies to improve their sustainability performance. Thus, the goal of firms undertaking strategic changes is to achieve a better sustainability performance (Chapin et al. 2010).

Harjoto et al. (2015) tested the impact of board diversity aspects measured by gender, race, age, outside directorship, tenure, expertise, and power, and provided evidence of a positive association between these diversity measurements and a firm's sustainability performance. The demographic differences among board members influence strategic decision making (Hafsi and Turgut 2013). The personal characteristics of board members affect how they question, criticize, counsel, or advise executives in their responsibilities toward a firm's performance. The demographic diversity (e.g., age, gender, and tenure) of the compensation committee increases the diversity of information resources and perspectives, and encourages creative, innovative decision making. This ultimately leads to strategic changes and improves sustainability performance (Wiersema and Bantel 1992).

Thus, my sub hypothesis relating to a board's demographic diversity at the compensation committee level is as follows:

H3(a): Firms with a more demographically diversified compensation committee board members will have a higher sustainability performance than firms with fewer demographically diversified compensation committee board members.

Experience Diversity

Responsiveness to resource dependencies and regulatory bodies require a larger board as well as a board with greater experience and wider educational and structural diversity. Thus, an array of divergent views on the firm's strategy is obtained (Pfeffer 1972, 1973). Consequently, diversity of experience is associated with a better performance.

Applying the resource dependency theory, Hillman et al. (2000) discussed that each director brings a unique attribute to the organization. Furthermore, board members can provide linkages to external resources. Thus, Hillman et al. (2000) identified new categories of board members that can provide resources to the organization. The first category, the insiders, is defined as the current and former officers of a firm (Fama and Jensen 1983). These officers provide resources that are internally generated and link specific relationships with the external context. The second category consists of business experts that are the current and former senior officers of other for-profit firms that provide alternative prospects for problem solving and decision-making. Furthermore, they can be avenues for communications among firms or provide legitimacy (Salancik and Pfeffer 1978). The third category consists of support specialists, who are professionals such as lawyers, bankers, and accountants. These actors provide public relationships and are potential channels for relations with larger organizations, suppliers, or governmental firms. They provided fundamental resources such as financial capital and legal support to the firm. Finally, the fourth category is the community influential category, members with special expertise and connections with firms that go beyond the customers, suppliers, and the competitors. They provide knowledge as the group of individuals who impact on the firm's operations and strategies (Baysinger and Butler 1985). Moreover, Peng et al. (2015) considered the importance of human capital in a firm's capital structure. They believed that the demand for

knowledge and skills is answered by the international experience of the executive managers (Barney 2001), which provides extra knowledge in international firms. Board capital, measured by directors' expertise, can improve a firm's sustainability performance.

Applying this line of research, I consider diversity in compensation committee experience in this study, and expect that the more experience-diversified the compensation committee is, the higher the probability that the firm will perform better in terms of the natural environment, society, and/or the community. The diversity of the experience of the compensation committee is included via the ratio of the board members who have expertise in several[17] experience categories over the total number of compensation committee members. Thus, I propose the following hypothesis:

H3(b): The more experience-diversified the compensation committee is, the higher the sustainability performance.

Diversity is a construct and as there is sometimes overlap among constructs, it should be measured against other constructs (Hafsi and Turgut 2013; Turgut and Hafsi 2008).

Section 3: Methodology

Sample selection

My sample includes firms listed in S&P500 at the end of 2013. S&P Capital IQ is the primary source of the characteristic data of the compensation committee members used for the diversity measurement. S&P Capital IQ is a leading provider of financial information, industry profile, transactions, executives, and board members. It contains information pertaining to more

[17] The categories included 1) insider, 2) business expert in the same industry 3) business expert in different industry, 4) support specialist, 5) community influential, 6) international experience, 7) human resource experience, 8) experience in for-profit businesses, and 9) experience in not-for-profit businesses.

than 4,200 firms (Phillips 2012). The CEO compensation data is collected from Execucomp and financial data is sourced from Compustat and the CSRP database.

Two individual undergraduate students were trained to code the background experience of the compensation committee members and the author checked the coding. The categories of previous experience included type of previous business expertise (insider, same industry, different industry, support specialist, international, and human resource), type of industry experience (for-profit or not-for-profit experience), and demographic information including age, gender, and tenure. These variables were used to construct the diversity indices.

I obtained the executives' compensation and executive characteristics data (age, gender, and CEO duality/ VPs' dependency) from Execucomp and supplemented the information with firms' financial performance from CSRP and Compustat. The ExecuComp database contains information regarding executive compensation for all firms listed in S&P 1500 since 1992. The data in this database reflects the most recent reporting requirement of the FAS123R in DEF14A form. Under the new reporting regime, effective since 2006, the cost of all employee stock options and equity-based compensation arrangements should be reported based on the estimated fair value of the awards. I define a CEO as the person identified as the chief executive officer of a firm in ExecuComp (CEOANN = CEO), and classify other executives (top executives other than CEOs) as vice presidents (VPs).

Sustainability data were collected from MSCI ESG Stats, which is an annual dataset of environmental, social, and governance (ESG) rankings of publicly traded companies. MSCI Stats includes the 3,000 largest US companies and the MSCI KLD 400 Social index. The MSCI raking system includes over 60 ESG indicators in seven ESG categories of environment, social (including community, human rights, employees, diversity, and customers), and governance

pillars. This ranking system utilizes a binary representation, which is indicated as 1 if they meet the criteria and 0 otherwise. The ranking in each category includes the sum of the strengths minus the sum of the concerns.

My final sample, which is provided in Table 1, consists of 319 firms from 16 industry groups, categorized by the North American Industry Classification System, with existing information as at the end of 2013.The intense nature of the data collection involved classifying the compensation committee members by their background experience. I am confident that my study analysis is well representative of the business context in the current market, as there has been little change in the structure of compensation committees and the general nature of policy makers' guidelines regarding the expected composition and skills of board directors.

"Insert Table 4.1 around here"

Variables

Dependent variables

CEO Power. To measure CEO power, I follow (Bebchuk et al. 2011) and estimate the CEO pay slice. CEO pay slice is defined as the percentage of the total compensation of the top five executives (including CEO) received by the CEO. To differentiate between the CEO's short-term and long-term power, I use the current portion of the compensation including salary and bonuses, and define the CEO's short-term power as the CEO's current pay slice. The current pay slice is measured by the percentage of the current compensation of the executives received by the CEO (CEO's current compensation over the current compensation of the top five executives including the CEO). I also define the CEO's long-term power in the same manner by comparing the total equity incentives of the CEO and the top five executives.

Sustainability performance. I measure sustainability performance using data collected from

Kinder, Lyndenberg, and Domini (KLD). KLD data contains time series data on corporate social responsibility and have been extensively used in management research. I use five KLD categories that measure the firms' commitment to the environment, social responsibilities (including product quality), employee relationships, community relations, and human rights.[18] Under KLD corporate social responsibility categories, firms are rated annually on 32 strengths and 31 concerns specified in dummy variables. Following prior studies in the literature (Gupta et al. 2016), I calculate sustainability performance as the sum of all strengths minus all concerns for 2013.

Independent variables

Executive structure. To test the first hypotheses, I use CEO power (short-term and long-term) as the first set of independent variables and regress them on their hypothesized determinants, the executives' structure. Executive structure includes 1) CEO age, 2) CEO duality, which is an indication of the dual responsibility of the CEO as the head of the executive team and as the chair of the board of directors, 3) CEO gender, the dummy variable with a value of 1 if the CEO is male and 0 otherwise, 4) VP female ratio, defined as the total number of female executives to the total number of executives, 5) VP age diversity, measured by the coefficient of variance[19] of the executives' ages, which is the standard deviation of the executives age to the average age of the executives and 6) executive dependency, which is defined as the percentage of the executives that serve on the board over the total number of the executives (the higher the ratio, the less independent the board is).

[18] I excluded KLD diversity and other governance categories, as these categories partially overlap with my other dependent variables.

[19] The coefficient of variation is defined in the diversity measurements explained in the next section.

Diversity Variables. Upper echelon theory emphasizes the characteristics of the executive team's background and their role in shaping a firm's outcomes (Hambrick and Mason 1984). Moreover, this theory provides evidence that the demographic characteristics and background experience of the board members influence the strategic decisions, which in turn affect financial performance and value creation (Hambrick 2007). Gupta et al. (2016) suggested that managerial experience, education, skills, and political ideology are unique and sustainable resources that lead to higher sustainability performance. Among all the internal resources, board diversity is the most investigated demographic structure. Harrison and Klein (2007) defined three classifications for board diversity including separation, variety, and disparity. While previous studies have mostly dealt with several experience categories, I distinguish between experience in the same and different industries and expand the diversity definitions. In this research, I consider a variety of classifications of board diversity and construct 11 indices for the diversity of variety, which refers to differences in type, opinion, and expertise (experience) including: 1) age, 2) gender, 3) tenure, 4) business expert in the same industry, 5) business expert in different industry, 6) support specialist, 7) community influential, 8) international business expertise, 9) human resource business experience, 10) business experience in for-profit businesses, and 11) business experience in not-for-profit businesses (Hillman et al. 2000; Salancik and Pfeffer 1978; Barney 2001) .

I construct the diversity indices using the three most commonly applied methods in the literature: 1) coefficient of variation (CV), 2) percentage of total, or 3) Blau index (BI). Depending on the type of the variable, I use the most appropriate method to make an index for diversity.

1) Coefficient of Variation (CV)

CV is defined as:

$$CV_i = {}^{\sigma_i}/_{\mu_i},$$

where σ_i is the standard deviation and μ_i is the mean of the variable.

For continuous variables like age and tenure, compensation committee diversity is measured by the CV, which shows that the higher the index, the more diversified the compensation committee in that construct.

2) Percentage of total

For the dummy variables that show the existence of a specific expertise, I count specific expertise and divide that into the total number of compensation committee members. The calculated ratio in each experience category is used as an experience diversity index for the compensation committee. The higher the calculated ratio, the more diversified the compensation committee in that experience category. The studied experience categories are 1) insider business experience, 2) business expert in the same industry, 3) business expert in a different industry, 4) support specialist, 5) community influential, 6) international business experience, 7) human resource experience, 8) for-profit and 9) not-for-profit experience. The higher the ratio, the more available a particular experience within an organization.

Following Hillman et al. (2001), Peng et al. (2015), and Barney (2001), the background experience of the compensation committee members is coded as 1 if the member is an 1) insider (individuals who are either current or former managers or employees of the company), 2) business experts (directors or executives) in the same industry, 3) business experts (directors or executives) in a different industry, 4) support specialists (individuals who are board members with background experience as bankers, lawyers, government bureaucrats, and public relations

experts), 5) community influential (individuals who have experience working at universities, not-for-profits, hospitals, and social and cultural companies), 6) international experience if the board member has background experience in overseas businesses, and 7) human resource experience.

3) Blau Index (BI)

The BI is mostly used to measure diversity in work group heterogeneity studies (Harrison and Klein 2007). It is defined as

$$BI_i = 1 - \sum_{j=1}^{s} p_{ji}^2,$$

where BI_i is the BI for firm i, j is the number of groups that the board member can fit into, and p is the proportion of the board members on the compensation committee that belong to group j.

Gender is the dummy variable, and each director should be coded as either 1 (male) or 0 (female). By applying the BI method, I construct gender diversity as

$GenderDiv_i = 1 - (female\ Ratio^2 + male\ Ratio^2)$)

The statistical interpretation of this index, ranging from 0 to 1, is the chance that two randomly selected members from a compensation committee belong to different categories (male/female).

All the diversity indices and other variables are defined in Appendix A.

Control variables

In my model, I control for the ownership structure, firm structure, board structure, and financial performance.

Ownership Structure. To consider the influence of external pressure, I control for the institutional owners, the percentage of the total outstanding shares. I also include insider

ownership, total shares that belong to the executives or board members as the percentage of the total outstanding shares

Consistent with my previous study, I use two proxies for employee skills, and each capture a potentially different dimension of task-relevant skills. One is R&D expenditure (normalized by total assets), which is a potential measurement of the higher required skills of the executives and other employees. The second is physical capital intensity (measured by net property, plant, and equipment to the number of employees), which indicates that capital-intensive firms generally require higher management skills than labor-intensive ones. I use revenue per employees (calculated as the total revenue over the number of employees) as a proxy of the firm's operating performance (Faleye et al. 2013). I also control for firm structure by adding firm size (natural logarithm of total assets) and board size (total number of the board members) in each step of the model. Similar to Faleye et al. (2013), I use the book-to-market ratio (measured as the ratio of the book value of the equity to the market value of the equity) as a proxy for growth opportunities. I measure the firm's performance using the ROA (ratio of the operating income after depreciation to total assets), current ratio, and leverage (long term debt divided by total assets). Moreover, I control for market performance by considering the price per share (the share price at the end of the year) in the equations.

Descriptive statistics

Table 2 represents the descriptive statistics of the sample. Panels G and H show firm structure and financial controls, respectively. The selected S&P 500 firms are large with a mean (median) revenue of $68.36 ($18.92) billion (Table 2: Panel H). The sizes of the firms, measured by the natural logarithm of the total assets, are 10.02, 9.85, 10.78, and 12.40 for mean, median and 75th and 95th percentiles, respectively. These indicates the size variations in the sample.

Another firm structure control, board size, which is measured by the number of board members, has a mean and median of 12.32 and 12, respectively, with a standard deviation of 4.47. This indicates an acceptable variation in the selected sample (Table 2: Panel G).

The mean, median, and 75th percentile of the current ratio are 1.69, 1.44, and 2.07, respectively. Leverage, measured by the liability to assets ratio, is 57.69 percent, 58.80 percent, and 72.24 percent for mean, median, and 75th percentiles, respectively. The average of the book-to-market value of the firms, which is a predictor of the future returns of the firm that are not captured in the revenues and returns (Pontiff and Schall 1998), is 0.44. Profitability, measured by (ROA) is on average 6.30 percent. The financial variable statistics are indications of the reasonable variety of the financial status of the sample firms.

The responsibilities of the CEO and other executives in the executive management team and the board of directors are further influential factors on sustainability performance. I distinguish between the rule of the CEO and that of VPs and include two sets of demographic variables for CEO and VPs. The average cash compensations of CEOs and VPs in the selected sample are $1.36 and $0.794 million and the equity incentives of the CEOs and VPs in their annual compensation packages are on average $14.12 and $3.75 million, respectively. Twenty-eight percent of all cash compensation paid to top executives is awarded to CEOs, while CEOs receive 47 percent of the total equity compensation (the statistics of the compensation details are not provided in the tables). The endogenous dependent variable, CEO power, measured by the logarithm of each of the pay slices (current and equity-based) and winsorized at 99 percent, is −1.28 and −0.82 (Table 4.2 Panel A).

I include the variable for executive characteristics (including the CEO and VPs) as a determinant of CEO power (short-term or long-term). The executive structure variables,

determinants of CEO power, are illustrated in Table 2: Panel B. On average, CEOs are 56 years old, and 98 percent of them serve on the board of directors. An average of 94 percent of firms are managed by male CEOs, while 10 percent of the total VPs (excluding CEOs) serve on the board, which means on average, less than 90 percent of the board members are independent (depending on whether the CEO serves on the board). On average, 9 percent of executive managers are female with an age diversity of 10 percent (Table 4.2 Panel B)

Sustainability performance is measured using KLD social and environmental scores, a method that has been widely used in sustainability literature. KLD includes strength and concern scores for three pillars: 1) social responsibility (including community, employees' relations, human rights, and products), 2) environment, and 3) governance (including diversity). Following other studies (Harjoto et al. 2014), I measure sustainability performance as the total score of a firm's social and environmental scores. To remove any concern regarding the correlations between the governance variables and diversity indices, I only use the environmental and social aspects of the sustainability performance extracted from the KLD rating system. The average sustainability performance, which is the total of the strengths minus the concerns in each pillar, is 0.10 with a maximum of 17 (Table 4.2 Panel C).

The determinants of sustainability performance at the board level and compensation committee diversity are demonstrated in Table 4.2 Panel D. I have several demographic and experience diversity measurements for the compensation committee.

Gender diversity is measured using the BI because gender is a dummy variable (1 if the executive is male and 0 otherwise). As age is a continuous variable, age diversity is measured using the CV. The compensation committee members are highly gender diversified but not for age. The standard deviation of gender diversity is 20 percent with a mean (median) of 0 (32)

percent. The standard deviation for age diversity is only 4 percent with a mean (median) of 9 (8) percent. A further diversity index, tenure, is a continuous variable (number of years that the individual served on the board as of December 31, 2013), thus this index is measured using the CV method. The mean (median) of tenure diversity is 50 (48) percent and the standard deviation shows that compensation committee members are highly tenured and gender diversified (SD = 0.20).

To measure work experience diversity, I code work experience in terms of the individual being an insider, business expert in the same or different industries, support specialist, community influential, international experience, human resource experience in the compensation committee, and background experience in for-profit and/or not-for-profit businesses. Work experience diversity in these groups is measured by the number of compensation committee members who have such experience divided by the total number of compensation committee members.

On average 0 percent, 5 percent, 30 percent, 5 percent, 8 percent, 80 percent, and 27 percent of the compensation committee members have business expertise as an insider, in the same industry, in different industries, support specialist, community-influential, international, and human resource work experience, respectively. Moreover, the mean of past experience in for-profit businesses is 25 percent, while that for not-for-profit experience is 8 percent (Table 2: Panel D).

I control for firm ownership by considering the percentage of institutional owners and insider owners in both steps of my structural model. Table 2, Panel E shows the statistics of the firms' ownership structure. On average, 31.73 percent of the firms are owned by the intuitional

owners and 1.87 percent are owned by insider owners, that is, the directors or senior managers of the company.

"Insert Table 4.2 around here"

The linear correlations between the applied variables are measured using Pearson product moment correlation coefficients and are illustrated in Table 3. CEO powers (short-term and long-term) are endogenous variables. A CEO's short-term and long-term powers are negatively correlated with sustainability performance (Short term: $r = -0.12$, $p = 0.03$; Long term: $r = -0.05$, $p = 34$). While short-term CEO power is significantly correlated with sustainability performance, the correlation between the CEO's long-term power and sustainability performance is not highly significant.

The expertise diversity indices (measured by the percentage of international experience and the percentage of not-for-profit experience) are correlated with the percentage of support specialist experience (%International.Exp: $r = -0.21$ and $p = 0.00$; %NonProfit.Exp: $r = 0.34$ and $p = 0.00$) and the percentage of not-for-profit experience and for-profit experience, which have Pearson correlations coefficients of $r = 0.46$. The remaining dependent variables are not highly correlated.[20] Thus, the Pearson correlations coefficients remove any collinearity concerns between the independent variables.

"Insert Table 4.3 around here"

Model

To test my hypotheses regarding the CEO power, sustainability and the compensation committee diversity, I apply a two-stage least square structural model, which is explained below.

The determinants of CEO power

[20] The Pearson coefficient correlations are mostly below 20 percent.

The management power theory and the agency theory both state that CEO power is constrained by a firm's management structure, ownership structure, and financial structure (Bebchuk et al. 2011). To test H1(a) and H1(b) regarding the determinants of CEO power, I consider the endogeneity of a CEO's short-term and long-term power. These variables are determined by the executive structure, firm activities including employee performance (revenue per employees), and a firm's complexity (R&D intensity and physical capital intensity), after controlling for the firm's ownership structure and financial controls. These relationships are illustrated in equations 1 and 2.

Equation 1:

CEO.Power.Short = Executive.Strucure + Firm.Complexity + Ownership.Strucure + Financial.Controls + Firm.Strucure + Industry.Group.Dummies

Equation 2:

CEO.Power.Long = Executive.Strucure + Firm.Complexity + Ownership.Strucure + Financial.Controls + Firm.Strucure + Industry.Group.Dummies,

in which,

$$\text{Executive. Structure} = \begin{bmatrix} \text{CEO. Gender} \\ \text{CEO. Age} \\ \text{CEO. Duality} \\ \text{VP. Female. Ratio} \\ \text{VP. Age. Div} \\ \text{VP. Dependency} \end{bmatrix}$$

$$\text{Firm. Complexity} = \begin{bmatrix} \text{Revenue/Employee} \\ \text{RD. Int} \\ \text{Physical. Capital. Int} \end{bmatrix}$$

$$\text{Financial Controls} = \begin{bmatrix} \text{Current. Ratio} \\ \text{Liability/Asset. Ratio} \\ \text{Book./Market. Ratio} \\ \text{Price/Share} \\ \text{ROA} \end{bmatrix}$$

$$\text{Ownership structure} = \begin{bmatrix} \%\text{Institutional. Own} \\ \%\text{Insider. Own} \end{bmatrix}$$

$$\text{Firm Struture} = \begin{bmatrix} \text{Firm. Size} \\ \text{Board. Size} \end{bmatrix}$$

Board diversity and Sustainability performance

To explore sustainability performance in the context of board diversity, sustainability performance (measured by environmental and social ratings) is regressed on endogenous CEO powers (predicted in equations 1 and 2) and board structure (including multiple board diversity indices), after controlling for the firm's ownership structure and financial controls. This relation is demonstrated in equation 3.

Equation 3:

Sustainability.Perform = CEO.Power.Short + CEO.Power.Long + Board.Diversity + Ownership.Strucure + Financial.Controls + Firm.Strucure + Industry.Group.Dummies,

in which,

$$\text{Board. Diversity} = \begin{bmatrix} Gender.Div \\ \text{Age. Div} \\ \text{Tenure. Div} \\ \%\text{insider} \\ \%\text{Business. Expert. Same} \\ \%\text{Business. Expert. Different} \\ \%\text{Support. Specialist} \\ \%\text{Community. Influential} \\ \%\text{International. Experince} \\ \%\text{HR. Experince} \\ \%\text{For} - \text{Profit. Experince} \\ \%\text{Not} - \text{for} - \text{Profit. Experince} \end{bmatrix}$$

On one hand, CEO power (short-term and long-term) is determined by the executives' characteristics including CEO gender, CEO age, CEO duality, VP female ratio, and VP dependency. Furthermore, firm complexity including financial performance (revenue per

employees), executive skills (measured by R&D intensity), and physical capital intensity determine CEO Power, which is the share of the CEO's current (equity-based) compensation that is paid to the executives (including the CEO). I also control for the firms' ownership structure by considering the percentage of institutional owners and insider owners. On the other hand, CEO power (short-term and long-term) along with board structure, including the multiple measurements of board compensation committee diversity, predict the level of sustainability performance.

I also control for firm structure by considering firm size and board size, and the firm's industry group by adding dummy variables for each industry group categorized by the two-number digit of the NAICS code in each equation. I estimate the above system of structural equations, where a CEO's powers, short-term and long-term, are the endogenous variables. The estimation is via a two-stage least square (2SLS) method. I apply the 2SLS method in Stata, to produce estimates by developing instrumented values for the CEO power variables (short-term and long-term), which are predicted by regressing CEO powers on the executive structure, firm complexity, and firm ownership variables, after controlling for the firms' structure and financial characteristics. After obtaining a consistent estimate for the covariance matrix of the equation disturbances, which are based on the residuals from a 2SLS regression estimation of each CEO power variable on its determinants, I regress the sustainability performance on the instrumental variables (CEO power [short-term/long-term]) and the compensation committee diversity indices after controlling for the firms structure and industry groups (Zinde-Walsh 1995). To account for the possibility of industry invariant variables, I add a dummy variable for industry group for the firms in each industry, categorized under NAICS industry codes. Thus, the results of the first and second steps are both controlled for industry group. Furthermore, I control for firm size by

adding a logarithm of the total assets and board size, calculated by the total number of board members.

Section 4: Results

CEO power, short-term and long-term, is determined by the structure of the executive structure and financial performance. The regression is well specified for short-term (long-term) CEO power by a chi2 of 145.34 (105.87), and 31 (25) percent of the variation in short-term (long-term) CEO power is predicted by the executive structure, ownership structure, financial performance, and the complexity of firms' activities.

CEO age is positively associated with CEO power. With a one-unit increase in the standard deviation of a CEO's age, the CEO's short-term (long-term) power increases by 99 (133) percent (Short term: β =0.009, p=0.00, Long term: β =0.012, p= 0.00). Contradictory to H1(d), the dual responsibility of a CEO reduces a CEO's short-term power by 17.87 (15.10) percent ($\beta = -0.20, \mathrm{p} = 0.01$). This variable is not significantly associated with a CEO's long-term power ($\beta = -0.16, \mathrm{p} = 0.12$). However, VP dependency, which is measured by the percentage of executives (other than the CEO) who serve on a board, reduces the CEO's short-term ($\beta = -0.12, \mathrm{p} = 0.00$) and long-term power ($\beta = -0.16, \mathrm{p} = 0.00$). These results imply that an increase in the percentage of VPs who serve on a board reduces a CEO's short-term power by 11 percent and long-term power by approximately 15 percent.

The VP female ratio is negatively associated with a CEO's short-term power ($\beta = -0.18$, p = 0.03), which means a 1 percent increase in the number of female executives in an executive team reduces the CEO's short-term power by approximately 17 percent. The ratio is positively associated with a CEO's long-term power, although it is insignificant. (β = 0.13, p = 0.28).

"Insert Table 4.4 around here"

The third equation, the effects of CEO power and diversity among compensation committee members on sustainability performance, are well specified (chi2 = 93.78, p = 0.00), and 19 percent of the variation of sustainability performance is explained with these constructs (R2 = 0.19). Applying the diversity indices one-by-one, I first test this relationship, and then include all the indices along with CEO power (short-term and long-term) in the final model. Provided in Table 4.5.2, the results demonstrate that regardless of the type or number of diversity indices that were initiated in my model, CEO power (short-term and long-term) is a strong, effective determinant of a firm's sustainability performance. The results of the first step of the structural model reveal[21] that there are no direct associations between the diversity of compensation committee members and executives' compensation packages (current and equity-based), which are proxies for the measurement of CEO power (short-term and long-term). Short-term CEO power has a negative association with sustainability performance. According to the agency theory, managers use their power to improve their own short-term benefits, which might not be in the interest of the various stakeholders. Thus, there is a negative relationship between short-term CEO power and sustainability performance. Short-term CEO power, measured by the CEO's current compensation as a fraction of the combined current compensation of the top executives (including the CEO), negatively predicts sustainability performance ($\beta = -7.98^{***}, p = 0.03$). Depending on which diversity index is applied in the model, short-term CEO power reduces sustainability performance by 62–65 percent. Thus, I find support for the agency theory (supporting H 2(a)) and provide evidence of the negative association between CEO short-term power and sustainability performance.

However, the predicted CEO power (long-term), measured by the CEO's equity-based compensation as a fraction of the combined equity-based compensation of the top executive

[21] The results of the first step are not reported but can be provided to reviewers upon request.

managers (including the CEO), positively predicts sustainability performance ($\beta = 6.64^{**}, p = 0.01$). Depending on the diversity index tested in the model, long-term CEO power improves the sustainability performance by 260–326 percent (supporting H 2(b)). Thus, the results indicate a positive association between long-term CEO power and sustainability performance. Therefore, powerful CEOs engage in sustainable activities to resolve conflict among various stakeholders. A better argument might be that sustainability projects take a longer time to provide benefits so the larger the equity-based pay, the greater the motivation for a CEO to implement sustainability objectives/projects.

Testing the third hypotheses regarding the association of demographic and experience diversity with sustainability performance, I include diversity indices in my model. None of the diversity indices alone explain sustainability performance. Nevertheless, by testing the full model with all the indices, I provide evidence that along with short-term/long-term CEO power, higher tenure diversity ($\beta = 1.39^{*}, p = 0.07$) and less experience in the same industry ($\beta = -3.53^{*}, p = 0.08$) improve sustainability performance. However, there are no significant associations between the other diversity indices and sustainability performance. These results support H3(a–b); diversity in demographics and experience among board members have a positive influence on strategic decision making (Hafsi and Turgut 2013) and leads to higher sustainability performance. Thus, compensation committee members with a higher degree of tenure diversity, encourages a higher level of creative innovative decision making, and this leads to strategic changes within a firm and improves its sustainability performance (Wiersema and Bantel 1992). Moreover, less experience in the same industry, which means more experience in other fields, brings greater knowledge and resources to the firm and again improves its sustainability performance.

Diversity is generally associated with higher sustainability performance. As the results indicate, demographic diversity, measured by tenure, is positively associated with sustainability performance. Moreover, higher experience diversity, measured by the ratio of experience in the same industry, leads to lower sustainability performance. According to my coding system, this ratio represents a lack of diversity and the other experience diversity indices are positively associated with sustainability performance but their association is mostly insignificant. Although the results of the diversity indices are mostly insignificant, as by including these indices the association between the CEO power and the sustainability performance improves, I conclude that the board structure (measured by several diversity indices) and CEO power are associated with sustainability performance.

While the results show that a higher degree of age diversity is at the cost of sustainable performance, I suggest that we need to delve deeper into this concept. Moreover, by testing more firms with greater gender diversification in boards and by removing concerns of low variability in the sample, researchers can provide stronger evidence with regard to gender diversity, which is not strongly significant in this study. I suggest further research by including more firm data for the years 2012 to 2015. More data might provide stronger support for the association between diversity and sustainability performance.

Section 5: Conclusion and discussions

I investigated the effect of CEO power on a firm's sustainability performance as determined by KLD. The agency view suggests that CEOs invest in the environmental and social dimensions of firm activities to enhance their current private benefits. Sustainability performance has been considered as the means to resolve conflicts among various stakeholders. I measured

CEO power by estimating the share of CEOs' current and equity-based compensation as a fraction of the combined current and equity-based compensation of the top executives to show that the association between CEO power and diversity at the compensation committee level and sustainability is non-monotonic. Supporting agency theory, short-term CEO power (measured by a CEO's current payment to total current payments to all executives including the CEO) will reduce sustainability performance. However, long-term CEO power (measured by a CEO's equity-based compensation to total equity-based payments to the executives including the CEO) will improve sustainability performance.

In my previous study (study no. 2), I found significant relations between the pay of the CEO and other executives as compared to that of non-executive employees and sustainability performance. In the present study, I compared CEO compensation packages with those paid to all executives and applied CEO power theories, which could explain the share of CEO pay compared with the total pay to executives. I also included the effect of board member structure by considering the indirect effect of board diversity on CEO power and sustainability.

I added several measurements of diversity to my equations and found a significant effect of CEO power along with board diversity, including tenure diversity and experience diversity (percentage of business experience in the same industry within the compensation committee) on sustainability performance. A more experience-diversified committee (especially with more representatives outside the industry) has a positive effect on sustainability performance.

To improve the models, I am convinced that expanding my coding system with the diversity indices in the time period, specifically before/after Sarbanes Oxley and before/after the recession (2008), the periods in which most of the governance disclosures and requirements have

been changed, I can obtain more convincing results about the effect of board structure on sustainability performance. Moreover, while I tested age diversity as a demographic diversity index that influences sustainability performance, the question arises: is sustainability performance affected by younger or older board members? I was not able to investigate this because of sample size limitations, and thus further research is required. Furthermore, expanding diversity to the entire board or to the board's sustainability committee might show improved results for the diversity indices.

Section 6: Appendix
Figure 4.1. Variables Definitions

Variable	Definition
A) CEO Power	
CEO Short-term Power	CEO short-term power is defined as the CEO's current pay slice, which is measured by the percentage of the current compensation of the executives that goes to the CEO (CEO's current compensation over the current compensation of the top five executives)
CEO Long-term Power	CEO long-term power is defined as the CEO's long-term pay slice, which is measured by the percentage of the equity-based compensation of the executives that goes to the CEO (CEO equity-based compensation over the equity compensation of the top five executives)
B) Executive Structure	
CEO.Age	Age of the CEO at the end of 2013
CEO.Duality	CEO duality defined by a dummy variable that is 1 if the CEO serves on the board and 0 otherwise
CEO.Gender	CEO gender defined by a dummy variable that is 1 if the CEO is male and 0 otherwise
VP.Female.Ratio	Executive female ratio defined as the total number of female executives over the total number of the executives
VP.Age.Div	Executive age diversity measured by the coefficient of variance of executives' ages, which is the standard deviation of the executives' ages to the average age of the executives
VP.Dependence	Executives' dependence, which is defined as the percentage of the executives that serve on the board over the total number of executives (the higher this ratio, the less independent the board is
C) Sustainability Performance	
Sustainability.Rating	Environmental and social rating of the company, which is measured as the total environmental and social strengths minus environmental and social concerns.
D) Compensation Committee Diversity Indices	
Gender.Div	Age diversity of the compensation committee members measured by the Blau index, which is 1 minus the ratio of the female members power 2 minus the ratio of the male members power 2
Board.Age.Div	Age diversity of the compensation committee members is defined as the coefficient of variance of the compensation committee members' age, which is the standard deviation of the compensation committee members' age to the average age of the compensation committee members
Board.Tenure.Div	Tenure diversity of the compensation committee members is defined as the coefficient of variance of the compensation committee members tenure, which is the standard deviation of the compensation committee members' tenure to the average tenure of the compensation committee members
%Insider	The percentage of insider compensation committee members who are current or former managers or employees of the company
%Business.Expert.Same	The percentage of the same-industry business experts who are directors that have been executives in the same industry
%Business.Expert.Different	The percentage of different-industry business experts who are directors that have been the executives in an industry that differs from the present company's industry
%Support.Specialist	The percentage of support specialists who are compensation committee members with background experience as bankers, lawyers, government bureaucrats, and public relations experts
%Community.Influential	The percentage of community influential compensation committee members are have experience working at universities, hospitals, and social and cultural

	companies
%International.Exp.	The percentage of compensation committee members with international business experience
%HR.Exp.	The percentage of compensation committee members with experience in human resources
%For-Profit.Exp	The percentage of compensation committee members with experience in for-profit organizations
%Not-for-Profit.Exp	The percentage of compensation committee members with experience in not-for-profit organizations
E) Ownership Structure	
% Institutional Invest	Total institutional ownership as the percent of shares outstanding
% Insider Invest	Total insider ownership as the percent of shares outstanding
F) Firm Structure	
Firm.Size	Firm size measured as a natural logarithm of the total assets at the end of 2013
Board.Size	Board size defined as the number of board members
G) Firm activity	
Revenue/Employee	Operating performance measured as revenue per employees
RD.Int	R&D intensity measured as R&D expenditure over total assets
Physical.Cap.Int	Physical capital intensity measured as net property, plant, and equipment per employee
H) Financial Controls	
Current.Ratio	Current ratio measured as current asset to current liabilities
Liab/Asset	Liability per asset (leverage) measured as the total debt to the total assets
BV/MV	Book-to-market value measured as the book value of the equity over the total market value of the equity
Price per Share	Shares price at the end of the year 2013
ROA	ROA measured as operating income after depreciation over the average total assets at the end of the year 2013

Table 4.1. Sample

NAICS Code-Des.	Freq.	Percent
11-Agriculture, Forestry, Fishing and Hunting	2	0.63
21-Mining, Quarrying, and Oil and Gas Extraction	23	7.21
22-Utilities	29	9.09
23-Construction	2	0.63
31,32,33-Manufacturing	127	39.82
42-Wholesale Trade	3	0.94
44,45-Retail Trade	20	6.27
48,49- Transportation and Warehousing	7	2.19
51-Information	21	6.58
52-Finance and Insurance	51	15.99
53-Real Estate and Rental and Leasing	11	3.45
54-Professional, Scientific, and Technical Services	6	1.88
56-Administrative and Support	8	2.51
62-Health Care and Social Assistance	3	0.94
72-Accommodation and Food Services	5	1.57
99-Other	1	0.31
Total	**319**	**100**

Table 4.2. Statistics summary

Variable	N	Mean	SD	Min	Max	Median	P75	P95
A) CEO Power								
CEO Power Short Term	319	-1.28	0.22	-1.74	-1.01	-1.23	-1.10	-1.01
CEO Power Long term	319	-0.82	0.32	-1.47	-0.44	-0.71	-0.56	-0.44
B) Executive Strucure								
CEO.Age	319	55.71	5.38	39.00	71.00	56.00	60.00	64.00
CEO.Duality	319	0.98	0.15	0.00	1.00	1.00	1.00	1.00
CEO.Gender	319	0.94	0.23	0.00	1.00	1.00	1.00	1.00
VP.Female.Ratio	319	0.09	0.13	0.00	0.50	0.00	0.20	0.40
VP.Age.Div	319	0.10	0.05	0.01	0.40	0.09	0.13	0.18
VP.Dependence	319	0.10	0.15	0.00	0.75	0.00	0.20	0.43
C) Sustainability Performance								
Sustainability. Rating	319	0.10	3.54	-2.00	17.00	0.00	4.00	10.00
D) Board Diveristy Indeces								
Gender.Div	319	0	0.20	0.00	0.50	0.32	0.38	0.48
Board.Age.Div	319	0.09	0.04	0.04	0.16	0.08	0.12	0.16
Board.Tenure.Div	319	0.50	0.20	0.20	0.82	0.48	0.66	0.82
%Insider	319	0.00	0.01	0.00	0.11	0.00	0.00	0.00
%Business expert-Same	319	0.05	0.07	0.00	0.18	0.00	0.11	0.18
%Business Expert-Different	319	0.30	0.10	0.14	0.44	0.31	0.38	0.44
%Support specialist	319	0.05	0.06	0.00	0.17	0.00	0.09	0.17
%Community Influential	319	0.08	0.07	0.00	0.20	0.09	0.14	0.20
%International.Exp.	319	0.80	0.20	0.50	1.00	0.80	1.00	1.00
%HR Exp.	319	0.27	0.27	0.00	0.75	0.25	0.50	0.75
%Profit.Exp	319	0.25	0.23	0.00	0.67	0.25	0.40	0.67
%NonProfit.Exp	319	0.08	0.13	0.00	0.33	0.00	0.20	0.33
E) Ownership Structure								
Institutional%	319	31.73	10.90	0.10	80.16	31.52	37.99	47.67
Insider%	319	1.87	5.07	0.00	38.19	0.31	0.99	9.91
G) Firm Structure								
Firm.Size	319	10.02	1.30	7.31	14.56	9.85	10.78	12.40
Board.Size	319	12.32	4.47	1.00	49.00	12.00	14.00	20.00
F) Firm Activity								
Revnue/Employee	319	804.68	1,340.55	0.00	13,797.74	404.67	816.43	2,833.43
RD.Int	319	0.02	0.04	0.00	0.38	0.00	0.02	0.11
Physical.Cap.Int	319	1.02	3.48	0.00	37.66	0.07	0.35	4.73
H) Financial Controls								
Total Revenue	319	68,359.27	202,958.60	1,490.27	2,102,273.00	18,918.64	48,273.00	243,291.00
Total Assets	319	23,141.15	40,753.30	1,211.98	474,259.00	10,295.00	22,284.00	101,093.00
Current.Ratio	319	1.69	1.24	0.00	8.46	1.44	2.07	4.31
Liab/Asset	319	57.69	21.07	0.00	95.19	58.80	72.24	87.46
BV/MV	319	0.44	0.28	0.02	1.43	0.37	0.60	0.99
ROA	319	6.30	4.96	-3.85	40.14	5.01	8.41	15.16
Price/Share	319	65.01	76.1726	9.43	1,140.56	53.15	277.11	527.05

Table 4.3. Pearson Correlations

Dependent/Endogenous Variables, Ownership Structure

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Dependent/Endogenous Variables									
CEO Power Short Term [1]	1.00								
CEO Power Long term [2]	0.51*	1.00							
p value	*0.00*								
Sustainability. Rating[3]	-0.12*	-0.05	1.00						
p value	*0.03*	*0.34*							
Executive Strcture									
CEO.Age[4]	0.23*	0.14*	0.03	1.00					
p value	*0.00*	*0.02*	*0.56*						
CEO.Duality[5]	-0.09	-0.06	0.05	-0.02	1.00				
p value	*0.12*	*0.29*	*0.34*	*0.78*					
CEO.Gender[6]	0.05	0.07	-0.15*	-0.01	-0.04	1.00			
p value	*0.39*	*0.23*	*0.01*	*0.82*	*0.51*				
VP.Female.Ratio[7]	-0.07	0.07	0.18*	0.01	-0.10	-0.12*	1.00		
p value	*0.22*	*0.20*	*0.00*	*0.86*	*0.08*	*0.04*			
VP.Age.Div[8]	-0.14*	-0.06	-0.06	-0.13*	-0.07	0.09	-0.10	1.00	
p value	*0.01*	*0.33*	*0.28*	*0.02*	*0.21*	*0.11*	*0.07*		
VP.Dependence[9]	-0.35*	-0.30*	-0.01	-0.02	-0.02	-0.04	-0.11	0.26*	1.00
p value	*0.00*	*0.00*	*0.87*	*0.72*	*0.77*	*0.46*	*0.05*	*0.00*	

Board Structure and Experience Diversity Variables

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
Board Structure																						
Board.Size[12]	-0.10	-0.11	0.23*	-0.01	0.02	-0.05	0.00	-0.09	0.03	0.05	0.00	1.00										
p value	*0.08*	*0.05*	*0.00*	*0.90*	*0.78*	*0.38*	*0.98*	*0.10*	*0.55*	*0.34*	*0.96*											
Board Diveristy Indeces																						
Board.Age.Div[13]	0.06	0.01	-0.14*	-0.09	-0.07	0.05	-0.08	0.07	0.13*	0.05	0.06	-0.12*	1.00									
p value	*0.28*	*0.85*	*0.01*	*0.09*	*0.20*	*0.33*	*0.13*	*0.20*	*0.02*	*0.39*	*0.30*	*0.04*										
Board.Tenure.Div[14]	0.03	-0.02	0.03	0.04	0.04	-0.05	-0.03	-0.02	0.01	0.20*	-0.01	0.00	0.12*	1.00								
p value	*0.65*	*0.67*	*0.65*	*0.45*	*0.48*	*0.40*	*0.66*	*0.75*	*0.92*	*0.00*	*0.85*	*0.96*	*0.04*									
Experince Diveristy																						
%Insider [15]	0.13*	0.17*	-0.07	-0.06	0.02	0.03	-0.08	0.07	0.02	-0.06	0.02	-0.02	0.00	-0.04	1.00							
p value	*0.02*	*0.00*	*0.21*	*0.31*	*0.74*	*0.59*	*0.14*	*0.20*	*0.75*	*0.28*	*0.73*	*0.70*	*0.96*	*0.46*								
% Business expert-Same[16]	0.11*	0.08	-0.20*	0.00	-0.05	0.13*	-0.06	-0.09	-0.12*	0.01	-0.03	-0.05	-0.03	0.13*	0.09	1.00						
p value	*0.04*	*0.17*	*0.00*	*0.93*	*0.36*	*0.02*	*0.27*	*0.10*	*0.04*	*0.81*	*0.63*	*0.35*	*0.59*	*0.02*	*0.12*							
%Business Expert-Different[17]	-0.04	0.03	0.16*	0.09	0.02	-0.13*	0.08	0.00	0.05	0.01	0.05	0.11*	0.03	-0.07	-0.06	-0.53*	1.00					
p value	*0.50*	*0.65*	*0.00*	*0.12*	*0.72*	*0.02*	*0.14*	*0.94*	*0.36*	*0.87*	*0.40*	*0.05*	*0.55*	*0.25*	*0.32*	*0.00*						
%Support specialist[18]	0.01	-0.08	-0.01	0.02	-0.03	-0.03	-0.03	0.04	0.11	0.04	0.05	0.06	-0.01	-0.09	0.04	0.01	-0.27*	1.00				
p value	*0.87*	*0.16*	*0.85*	*0.75*	*0.57*	*0.63*	*0.57*	*0.50*	*0.06*	*0.48*	*0.40*	*0.30*	*0.86*	*0.13*	*0.52*	*0.86*	*0.00*					
%Community Influential[19]	-0.05	-0.05	0.13*	0.08	-0.03	0.11	0.00	0.05	-0.01	0.06	-0.05	0.15*	0.04	0.04	-0.07	0.04	-0.08	-0.19*	1.00			
p value	*0.40*	*0.42*	*0.02*	*0.15*	*0.56*	*0.05*	*1.00*	*0.40*	*0.90*	*0.31*	*0.36*	*0.01*	*0.52*	*0.53*	*0.21*	*0.51*	*0.17*	*0.00*				
%International.Exp[20]	0.04	0.06	-0.01	-0.03	-0.07	-0.10	0.06	-0.08	-0.02	0.07	0.01	0.09	0.07	-0.01	-0.08	-0.11*	0.17*	-0.21*	0.07	1.00		
p value	*0.45*	*0.30*	*0.89*	*0.56*	*0.23*	*0.07*	*0.29*	*0.17*	*0.71*	*0.22*	*0.92*	*0.10*	*0.24*	*0.90*	*0.15*	*0.05*	*0.00*	*0.00*	*0.20*			
%HR Exp[21]	-0.03	-0.04	0.01	0.07	-0.04	-0.01	0.02	-0.03	0.07	-0.07	0.03	-0.05	0.04	0.06	-0.01	-0.11	0.19*	-0.19*	-0.02	-0.02	1.00	
p value	*0.53*	*0.50*	*0.84*	*0.22*	*0.51*	*0.91*	*0.73*	*0.59*	*0.23*	*0.21*	*0.59*	*0.40*	*0.50*	*0.25*	*0.81*	*0.06*	*0.00*	*0.00*	*0.67*	*0.69*		
%Profit.Exp[22]	0.02	-0.01	0.08	-0.08	-0.01	-0.10	0.02	0.00	-0.08	0.06	0.00	0.01	0.02	-0.12*	-0.03	-0.04	-0.08	0.20*	-0.02	-0.01	-0.10	1.00
p value	*0.68*	*0.89*	*0.13*	*0.15*	*0.80*	*0.07*	*0.71*	*0.99*	*0.16*	*0.26*	*0.94*	*0.85*	*0.79*	*0.04*	*0.58*	*0.47*	*0.16*	*0.00*	*0.79*	*0.90*	*0.07*	
%NonProfit.Exp[23]	0.10	-0.02	0.09	0.02	0.01	-0.03	-0.02	-0.02	-0.06	0.05	-0.02	0.11*	-0.03	-0.04	0.01	0.01	-0.24*	0.34*	0.04	-0.14*	-0.19*	0.46*
p value	*0.08*	*0.69*	*0.12*	*0.71*	*0.81*	*0.60*	*0.77*	*0.74*	*0.31*	*0.35*	*0.71*	*0.04*	*0.61*	*0.43*	*0.90*	*0.79*	*0.00*	*0.00*	*0.53*	*0.01*	*0.00*	*0.00*

Firm Structure

	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]
Firm Structure														
ROA[24]	-0.12*	-0.01	0.13*	0.06	0.01	-0.06	1.00							
p value	0.04	0.80	0.02	0.29	0.89	0.33								
ROE[25]	-0.06	0.04	0.15*	0.04	-0.04	0.01	0.54*	1.00						
p value	0.30	0.52	0.01	0.52	0.53	0.84	0.00							
Revnue/Employee[26]	0.03	0.00	0.08	-0.01	-0.01	-0.02	-0.10	-0.06	1.00					
p value	*0.59*	*1.00*	*0.17*	*0.88*	*0.92*	*0.73*	*0.07*	*0.30*						
RD.Int[27]	-0.03	0.02	-0.07	-0.09	0.10	0.06	0.04	0.00	-0.11*	1.00				
p value	*0.57*	*0.77*	*0.19*	*0.12*	*0.09*	*0.28*	*0.45*	*0.98*	*0.05*					
Physical.Cap.Int[28]	0.06	0.05	-0.07	0.02	0.04	0.01	-0.15*	-0.10	0.25*	-0.11*	1.00			
p value	*0.29*	*0.37*	*0.21*	*0.79*	*0.47*	*0.91*	*0.01*	*0.08*	*0.00*	*0.05*				
BV/MV[29]	0.08	-0.01	-0.08	-0.01	-0.07	0.02	-0.59*	-0.40*	0.08	-0.26*	0.05	1.00		
p value	*0.18*	*0.89*	*0.15*	*0.86*	*0.23*	*0.74*	*0.00*	*0.00*	*0.15*	*0.00*	*0.39*			
Current.Ratio[30]	-0.05	0.03	0.05	0.06	-0.03	-0.10	0.3617*	0.07	-0.07	0.21*	-0.10	-0.22*	1.00	
p value	*0.34*	*0.56*	*0.37*	*0.25*	*0.63*	*0.07*	*0.00*	*0.24*	*0.24*	*0.00*	*0.09*	*0.00*		
Liab/Asset31]	0.01	-0.04	0.04	-0.02	-0.03	-0.01	-0.09	0.21*	0.06	-0.08	0.06	-0.20*	-0.13*	1.00
p value	*0.89*	*0.43*	*0.46*	*0.75*	*0.55*	*0.92*	*0.11*	*0.00*	*0.27*	*0.14*	*0.31*	*0.00*	*0.03*	
Firm.Size[32]	0.08	0.17*	-0.02	-0.02	0.15*	0.15*	-0.41*	-0.14*	0.11*	-0.23*	-0.02	0.47*	-0.32*	-0.01
p value	*0.15*	*0.02*	*0.78*	*0.68*	*0.01*	*0.01*	*0.00*	*0.01*	*0.05*	*0.00*	*0.76*	*0.00*	*0.00*	*0.84*

Table 4.4. The determinants of CEO Power

Equation	Equation 1: CEO Power (Short term)			Equation 2: CEO Power (Long term)		
Dep:CEOPower	**Coef.sig (t)**	**p**	**Effect size**	**Coef.sig (t)**	**p**	**Effect size**
Board Structure						
Board.Size	-0.001 (-0.45)	0.65	-0.12	-0.01* (-1.67)	0.10	-0.67
Executive Strcture						
CEO.Gender	-0.01 (-0.21)	0.83	-1.01	0.09 (1.32)	0.19	8.96
CEO.Age	0.01*** (4.89)	0.00	0.99	0.01*** (4.64)	0.00	1.33
CEO.Duality	-0.2*** (-2.66)	0.01	-17.87	-0.16 (-1.58)	0.12	-15.10
VP.Female.Ratio	-0.18** (-2.24)	0.03	-16.56	0.13 (1.09)	0.28	13.38
VP.Age.Div	-0.1 (-0.43)	0.66	-9.81	0.02 (0.07)	0.94	2.37
VP.Dependence	-0.12*** (-7.16)	0.00	-11.09	-0.16*** (-6.74)	0.00	-14.75
Ownership Structure						
Institutional%	-0.0011 (-1)	0.32	-0.11	-0.0004 (-0.24)	0.81	-0.04
Insider%	-0.002 (-0.83)	0.41	-0.18	0.004 (1.22)	0.22	0.40
Firm Structure & Financial						
Revnue/Employee	-0.00000004 (0)	1.00	0.00	-0.00003** (-2.43)	0.02	0.00
RD.Int	-0.48* (-1.69)	0.09	-37.90	-0.12 (-0.31)	0.76	-11.32
Physical.Cap.Int	0.001 (0.33)	0.74	0.13	0.003 (0.5)	0.61	0.28
Current.Ratio	-0.01 (-1.01)	0.32	-1.02	-0.02 (-1.53)	0.13	-2.48
Liab/Asset	0.001 (1.37)	0.17	0.08	0.0005 (0.57)	0.57	0.05
BV/MV	-0.07 (-1.23)	0.22	-7.37	-0.07 (-0.73)	0.46	-6.67
ROA	-0.002 (-0.65)	0.51	-0.20	-0.0069 (-1.51)	0.13	-0.69
Price /Share	-0.0002 (-1.03)	0.30	-0.02	-0.0002 (-0.62)	0.53	-0.02
Firm.Size	-0.01 (-1.25)	0.21	-1.46	-0.03* (-1.8)	0.07	-3.22
Intercept	-1.22*** (-5.13)	0.00	-70.60	-0.91*** (-2.62)	0.01	-59.70
Industry Group Dummy	**Yes**			**Yes**		
R-sq	0.31			0.25		
chi2	145.34			105.87		

Table 4.5.1. CEO power and sustainability performance (all diversity indices)

Dependent: Sustainability Performance	Coef.sig (t)	p
CEO Power/Pay Slice		
CEO power (short-term)	-7.98** (-2.24)	0.03
CEO power (longterm)	6.64** (2.55)	0.01
Board Structure		
Board.Size	0.14*** (3.26)	0.00
Board Diversity		
Gender.Div	0.45 (0.55)	0.58
Board.Age.Div	-6.86 (-1.57)	0.12
Board.Tenure.Div	1.39* (1.84)	0.07
%Insider	-2.15 (-0.18)	0.86
%Business expert-Same	-3.53* (-1.75)	0.08
%Business Expert-Different	1.58 (1.04)	0.30
%Support specialist	1.61 (0.75)	0.45
%Community Influential	2.57 (1.43)	0.15
%International.Exp.	0.04 (0.06)	0.95
%HR Exp.	0.78 (0.68)	0.49
%Profit.Exp	0.51 (0.62)	0.54
%NonProfit.Exp	0.84 (1.22)	0.22
Ownership Structure		
Institutional%	0 (-0.15)	0.88
Insider%	0.01 (0.36)	0.72
Firm Structure & Financial		
Current.Ratio	-0.05 (-0.25)	0.81
Liab/Asset	0.01 (1.25)	0.21
BV/MV	-2.04* (-1.79)	0.07
ROA	0.01 (0.21)	0.84
price/Share	0 (-0.62)	0.54
Firm.Size	0.7*** (2.8)	0.01
Intercept	-13.4** (-2.47)	0.01
Industry Group Dummy	Yes	
R-sq	0.19	
chi2	93.78	

Table 4.5.2. CEO power and sustainability performance (individual diversity index)

Equation 3:	Board.Female.Ratio		Board.Age.Div		Board.Tenure. Div		Insider		Business expert-Same		Business Expert-Different		Support specialist		Community Influential		%International. Exp.		%HR Exp.		%Profit.Exp		%NonProfit.Exp	
Dependent: Sustainability Performance	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**	**Coef.sig (t)**	**p**
CEO Power/Pay Slice																								
CEO power (short-term)	-0.61*** (-2.8)	0.01	-0.61*** (-2.82)	0.01	-0.62*** (-2.85)	0.00	-0.64*** (-2.97)	0.00	-0.62*** (-2.89)	0.00	-0.63*** (-2.91)	0.00	-0.63*** (-2.91)	0.00	-0.62*** (-2.88)	0.00	-0.65*** (-3)	0.00	-0.65*** (-2.98)	0.00	-0.66*** (-3.01)	0.00	-0.64*** (-2.96)	0.00
CEO power (longterm)	2.85** (2.04)	0.04	3.01** (2.15)	0.03	3.19** (2.29)	0.02	3.24** (2.38)	0.02	3.33** (2.39)	0.02	3.09** (2.22)	0.03	3.19** (2.28)	0.02	3.07** (2.24)	0.03	3.26** (2.34)	0.02	3.18** (2.3)	0.02	3.31** (2.37)	0.02	3.18** (2.29)	0.02
Board Structure																								
Board.Size	0.16*** (3.2)	0.00	0.16*** (3.16)	0.00	0.16*** (3.16)	0.00	0.16*** (3.27)	0.00	0.17*** (3.36)	0.00	0.16*** (3.14)	0.00	0.16*** (3.24)	0.00	0.15*** (3.06)	0.00	0.16*** (3.3)	0.00	0.16*** (3.19)	0.00	0.17*** (3.34)	0.00	0.16*** (3.27)	0.00
Board Diversity																								
Gender.Div	1.59 (1.21)	0.23																						
Board.Age.Div			-7.12 (-1.43)	0.15																				
Board.Tenure.Div					0.87 (0.9)	0.37																		
%Insider							-5.75 (-0.37)	0.72																
%Business expert-Same									-6.61** (-2.23)	0.03														
%Business Expert-Different											2.5 (1.28)	0.20												
%Support specialist													0.15 (0.05)	0.96										
%Community Influential															3.7 (1.46)	0.15								
%International.Exp.																	0.88 (0.93)	0.35						
%HR Exp.																			0.94 (1.38)	0.17				
%Profit.Exp																					-0.95 (-1.12)	0.26		
%NonProfit.Exp																							1.26 (0.86)	0.39
Ownership Structure																								
Institutional%	0.02 (1.03)	0.30	0.02 (1.26)	0.21	0.02 (0.98)	0.33	0.02 (1.12)	0.27	0.02 (1.09)	0.27	0.02 (1.06)	0.29	0.02 (1.14)	0.26	0.02 (1.09)	0.28	0.02 (1.04)	0.30	0.02 (1.09)	0.27	0.02 (1.22)	0.22	0.02 (1.17)	0.24
Insider%	0.08** (1.97)	0.05	0.08* (1.95)	0.05	0.08* (1.91)	0.06	0.07* (1.91)	0.06	0.07* (1.86)	0.06	0.07* (1.86)	0.06	0.07* (1.9)	0.06	0.08** (1.99)	0.05	0.07* (1.85)	0.06	0.07* (1.87)	0.06	0.07* (1.88)	0.06	0.07* (1.91)	0.06
Firm Structure & Financial																								
Current.Ratio	-0.02 (-0.35)	0.72	-0.01 (-0.25)	0.80	-0.02 (-0.32)	0.75	-0.02 (-0.31)	0.76	-0.02 (-0.37)	0.71	-0.02 (-0.32)	0.75	-0.02 (-0.37)	0.71	-0.02 (-0.33)	0.74	-0.02 (-0.44)	0.66	-0.02 (-0.39)	0.70	-0.02 (-0.33)	0.74	-0.02 (-0.37)	0.71
Liab/Asset	0.01 (1.07)	0.29	0.01 (1.05)	0.29	0.01 (1.19)	0.23	0.01 (1.09)	0.28	0.01 (1.06)	0.29	0.01 (1.07)	0.29	0.01 (1.11)	0.27	0.01 (0.99)	0.32	0.01 (1.17)	0.24	0.01 (1.09)	0.28	0.01 (1.17)	0.24	0.01 (1.1)	0.27
BV/MV	-0.09 (-0.5)	0.62	-0.08 (-0.43)	0.67	-0.09 (-0.48)	0.63	-0.08 (-0.42)	0.67	-0.03 (-0.19)	0.85	-0.07 (-0.4)	0.69	-0.08 (-0.41)	0.68	-0.11 (-0.61)	0.54	-0.07 (-0.37)	0.71	-0.06 (-0.34)	0.73	-0.07 (-0.35)	0.73	-0.08 (-0.46)	0.65
ROA	0.59*** (2.94)	0.00	0.62*** (3.15)	0.00	0.64*** (3.22)	0.00	0.63*** (3.18)	0.00	0.58*** (2.9)	0.00	0.6*** (3)	0.00	0.63*** (3.16)	0.00	0.6*** (3.05)	0.00	0.6*** (2.96)	0.00	0.6*** (3.02)	0.00	0.64*** (3.19)	0.00	0.62*** (3.12)	0.00
Industry Group Dummy	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R-sq	0.13		0.13		0.12		0.11		0.12		0.12		0.11		0.13		0.11		0.12		0.11		0.12	
chi2	72.30		73.39		69.99		70.35		74.25		71.92		69.22		71.88		70.13		70.90		70.13		70.12	

Chapter Five: Conclusions

In three interrelated studies, I investigate the internal factors that influence sustainability performance. In all three studies, I consider the endogenous internal controls that affect sustainability performance including operational controls (Study One), strategic controls (Studies One, Two, and Three), and reporting quality (Study One).

The results of the first study show that a systems approach is essential when studying sustainability performance and quality of reporting, and that the resource-based view explains the differences in environmental performance and reporting. I find that strategic components, when integrated with operational systems, lead to better performance and reporting consistent with the resource-based view. Thus, I recommend a holistic systems approach to firms wanting to maximize their sustainability objectives. In the overall analysis, both strategic and operational characteristics are positively associated with better sustainability performance, which in turn is positively associated with reporting quality. At the strategic level, similar to those of Clarkson et al. (2008a) and Rossouw (2005), my results suggest that the existence of a sustainability committee and board diversity are the most effective predictors of environmental performance (one aspect of sustainability). My research also contributes to the literature on sustainability performance by clarifying the role of the sustainability report in the achievement of a high level of sustainability performance (Al-Tuwaijri et al. 2004a; Clarkson et al. 2008a). Moreover, while previous studies have often investigated the role of the sustainability report as a one-way communication vehicle (from the firm to stakeholders), my research contributes to the literature by providing evidence that if reporting is of high quality, it can act as a vehicle of communication both to and from the stakeholders for identifying material aspects to target for improved sustainability performance. The firm loses this important tool for sustainability improvement if it does not produce a report. My research clarifies some of the mixed results

found in prior research at the strategic level (Walls et al. 2012), demonstrating the importance of my differentiating variables such as the region, the industry group, and the firm's sustainability performance relative to its peers in the same industry group. However, the greatest contribution of my research is the insight it provides into the importance of the less-researched operational components compared with the strategic governance components. In all contexts, when investigating the differentiating variables, my operational variables are significant in highlighting a high level of performance and reporting. The only operational variable that is not significant in the regional analysis is EMS certification for North American firms, which is less common in this region. When analyzing laggards (firms whose performance is below the industry group average) and leaders (firms whose performance is above the industry group average), the EMS certification and report assurance of the laggards are insignificant compared with those of the leaders.

Regarding the importance of incentive systems, I expected to find a significant positive association between the executives' compensation and sustainability performance. However the results of the first study do not provide support for my hypotheses because of the lack of data linking compensation to the attainment of sustainability objectives. My research contributes to the literature by comparing executive pay with that of non-executive employees and studying the relationship between the pay gap and sustainability performance. I considered the association between the actual pay ratio, which is the comparison between the executives' pay and that of non-executive employees. Addressing the importance of employee compensation and its effect on the firm's sustainability performance, I find that while operational performance increases the bargaining power of the executives and improves their compensation, the effect of the unequal pay can be observed in sustainability performance, measured by the firm's environmental and social ratings (including environmental strengths and concerns). These

results support the behavioral agency theories, which imply that a higher monetary incentive at management level can result in employees shirking their responsibilities and lower sustainability performance in the non-financial dimensions (e.g., environmental). On one hand, the executives' pay packages provide an incentive for better financial performance, but on the other hand this can come at the cost of the other employees' dissatisfaction and lower sustainability performance. These results might be due to the executive managers' behaviors in pursuing short-term profits at the expense of long-term performance, or taking excessive risks that could jeopardize the security and reliability of the organization. Thus, the pay ratio between executive and non-executive employees has been given broad coverage in the media and academic articles (Faleye et al. 2013), and has intersected with considerations of firms' performance.

In the second paper, by narrowing the study to the compensation variable, I find a significant relationship between the pay ratio and sustainability performance. Extending this line of research, in the third study I compare the CEO compensation packages (both short term and long term) with those of other executives and apply the CEO power theory to determine its effect on sustainability performance. In this study, I add the effect of the board structure by considering the indirect effect of board diversity on CEO power and sustainability.

I add several measures of diversity to my equations and find a significant effect of CEO power and board diversity, including diversity in tenure and experience (amount of the compensation committee's business experience in the same industry) on sustainability performance. The results can be justified by the fact that a diverse compensation committee helps to keep CEO pay in line with sustainability values that are in the interests of the corporate community rather than those of the CEO in terms of corporate wealth distribution.

Stakeholders such as standards setters, board members, and executive managers should consider the results of my studies in their decision-making about disclosure requirements and/or contract negotiations with employees at the management or lower levels of the organization. They provide a warning that monetary incentives at the executive level can be disincentives at the non-executive employee level, whereby the lower the pay ratio between executive and non-executive employees, the more the firm's values are consistent with those pertaining to sustainability.

These studies can be expanded by improving the diversity system rating to providing more refined measurement of diversity at the board and executive management level to determine the effects of diversification at the board, management, and lower levels of the organization. Moreover, future studies should address ethnicity, nationality, and more culturally diversified organizations at the international level.

The results of such studies will be of interest to regulators and the government in countries such as Canada with more diversified populations and rich supplies of environmental and natural resources that require improvements in their environmental, social, and community performances.

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