

Quality of Sustainability Reporting Based on Global Reporting Initiative (GRI) Guidelines: The
Impact of Company Characteristics

by

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Abstract

With the rise in stakeholders' demand for more transparency and information disclosure, companies are increasingly publishing sustainability reports to improve their public image. The purpose of this thesis is to explore characteristics of companies that have high quality sustainability reports. Based on the extant literature; location, organization size, third-party verification, and ISO certification are potential factors that influence a company's reporting performance. A statistical rating method, developed using Global Reporting Initiative (GRI) principles, is used to grade sustainability reports. GRI appears to be the most widely used and dominant sustainability reporting guideline. Hypotheses are tested using ANOVA and regression techniques. The results reveal that firm size and ISO certification influence the quality of sustainability reports.

Key words: sustainability report; GRI; firm size; third-party verification; location; ISO

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CHAPTER 1: INTRODUCTION

An increasing number of people care about environmental and social effects of organizations' activities internationally. However, traditional financial-based annual reports do not disclose all information the public wants to know, leading to the emergence of sustainability reports.

There is no agreed-upon definition of "sustainability" (Farneti & Guthrie, 2009). A definition being used frequently is: "meeting the needs of the present generation, without compromising the ability of future generations to meet their own needs" (WCED, 1987). Sustainability reports help disclose companies' behaviors performance in economic, environmental, and social dimensions (Farneti & Guthrie, 2009), known as "triple bottom line".

With an increasing number of companies producing sustainability reports (Daub, 2007; Farneti & Guthrie, 2009; Kolk, 2010; Morhardt, Baird, & Freeman, 2002), different guidelines to regulate the format and content of reports have been devised. GRI appears to be the most popular guideline among them. Nevertheless, even with GRI instructions and principles for defining the quality of reports, sustainability reports are inconsistent in terms of quality.

To evaluate sustainability reports published by companies having various backgrounds, a variety of frameworks have been proposed. But these frameworks are too subjective to have a consistent and reliable result from different people.

A literature review has been done focusing on scoring systems designed to rate sustainability

reports. No papers were found that developed rating system based on GRI Principles. In the meantime, contingency theory has not been used in sustainability report research. Given that quality of sustainability reports are uneven and gaps in the literature, the research question is: What are the impact of companies' characteristics on the quality of sustainability reports based on GRI? To address the research question, a statistical method to rate companies' sustainability reports is created based on these GRI Principles: Completeness, Balance, Comparability, Clarity, Timeliness and Stakeholder Inclusiveness. This should yield more objective results. The scores will be used to test the relationship between characteristics of companies, including firm size, third party verification and the use of ISO, and the quality of reports.

The purpose of the thesis is twofold: (1) to identify determinants of sustainability report quality and (2) to develop a standardized rating system, which is reliable and consistent, for all kinds of reports guided by GRI, enabling a comparison not limited to industries or other factors.

This paper contributes to the sustainability report research in four ways. First, it applies contingency theory for the first time in research related to sustainability reports. Secondly, this paper empirically assesses the influence of firm size, location, ISO and third party assurance on the quality of sustainability reports. The managerial contribution is that the result can help managers responsible for producing sustainability reports adopt factors and practices that are beneficial to the quality of reports. Another managerial contribution is that the statistical assessment of sustainability reports based on the GRI Principles could help investors and other stakeholders compare sustainability reports with their competitors to make informed decisions.

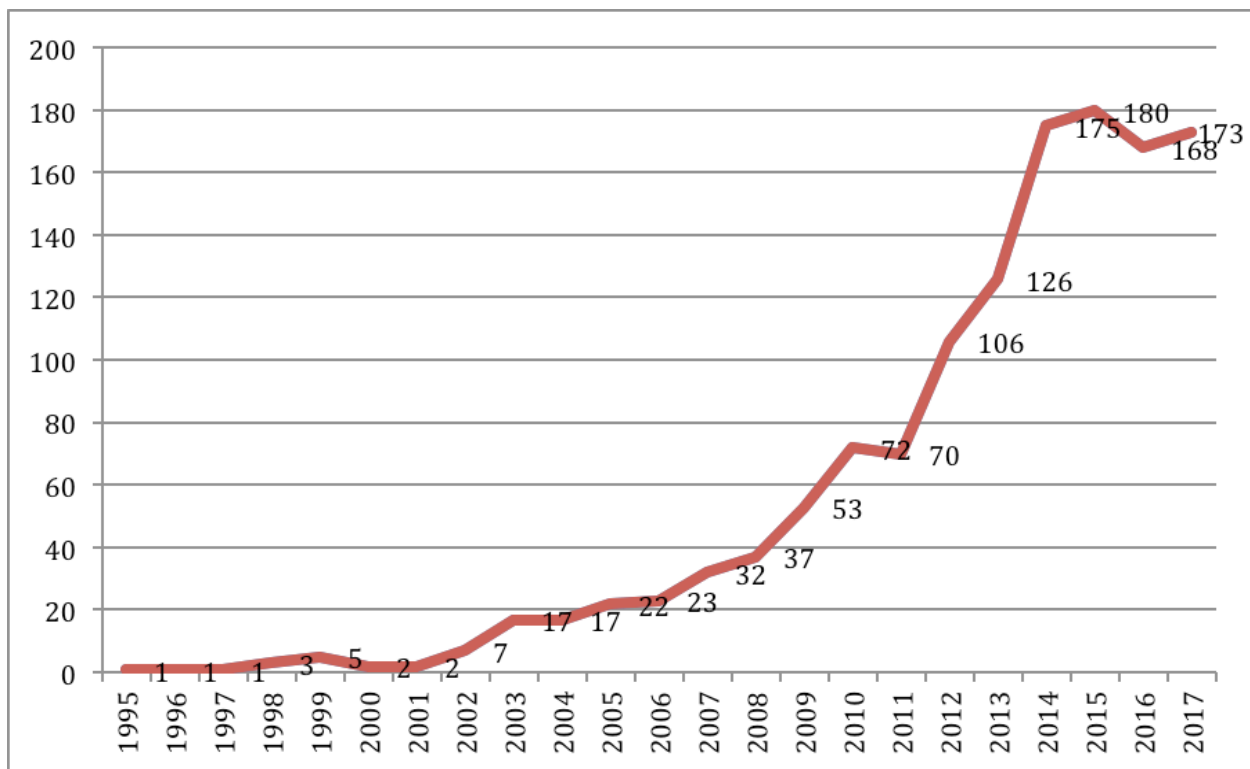
The rest of the paper is organized as follows. The second chapter gives an overview of past literature on sustainability reports, GRI and rating sustainability reports. This chapter also draws on operations and SCM literature to define sustainability and present contingency theory as a relevant theoretical framework. Building on the literature, the third chapter develops several hypotheses. The fourth chapter explains the methodology used to collect and analyze the data. Statistical results are presented and discussed in the fifth chapter. Conclusions, contributions, limitations and directions for future research can be found in the sixth and final chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 What is sustainability?

There has increased significantly in the number of articles on supply chain sustainability since 1995. Figure 1 is a chart of articles published on supply chain sustainability from 1995 to 2017. A search of the ABI/Inform database, limited to *peer reviewed* articles, with “supply chain” and “sustainable” or “sustainability” in the abstracts, uncovered around 1,300 articles. The first article was published in 1995, followed by an exponential increase to 173 in 2017.

Figure 1. Articles on Sustainable Supply Chains or Supply Chain Sustainability



However, there is not an agreed-upon definition for the term “sustainability” (Farneti &

Guthrie, 2009). Management scholars originally linked this concept to organizational survival with financial terms (Baumol, Bailey, & Willig, 1977). Over time, strategic management principles focusing on sustainable advantages merged with environmental and economic management, leading to a new understanding of sustainability (Gallo & Christensen, 2011).

The most widely used definitions are interpreted by Sikdar (2003) to include four principles:

- (1) Society's speed of consuming renewable resources is not faster than speed of resource regeneration.
- (2) Society's speed of consuming non-renewable resources is not faster than speed of (substitute) renewable resource development.
- (3) Society's speed of releasing pollution is not faster than the assimilative capability of the environment.
- (4) Society's human needs are met worldwide.

Further, Sikdar (2003) defines sustainability as "a wise balance among economic development, environment stewardship, and social equity."

Bansal (2010) defines business sustainability as "the creation of resilient organization through integrated economic, social and environmental system." Based on their literature review, Larson and Khare (2010) found that *sustainability* tends toward a focus on environmental issues or joint consideration of the economic and environmental dimensions. Gallo and Christensen (2011) assert that: "Many definitions indicate that sustainability refers to economic and/or ecological and/or social aspects of the relationship between business and society."

More recently, Bertoneclj et al. (2016) suggest that corporate sustainability is an approach to balancing economic and social progress and environmental management. Sustainability not only requires decrease in the pollution and resource consumption, but also calls for a transformation in the way people live and consume natural resources for economic purpose, to be harmonized with human health and security (Koh, Morris, Ebrahimi, & Obayi, 2016)

Another recent study analyzed 24 existing sustainability definitions from more than 200 papers and created a newly revised definition of sustainability with five constructs: “(1) after a defined period of time, (2) a program, clinical intervention, and/or implementation strategies continue to be delivered and/or (3) individual behavior change is maintained; (4) the program and individual behavior change may evolve or adapt while (5) continuing to produce benefits for individuals/systems” (Moore, Mascarenhas, Bain, & Straus, 2017).

2.2 Contingency theory

Contingency theory suggests there is no best way to manage an organization; preferred organizational structures depend on contextual factors. Organizations also need to adapt to the changes in external environment, as well as to operate in alignment with their internal structure and strategies (Larson & Foropon, 2018). The *contingency triangle* includes three factors: the external environment in which an organization operates; characteristics of the organization, such as organization culture, resources and structure; and strategies an organization uses to be balanced between its internal structure and external environment (Crandall and Crandall, 2010).

Contingency theory has been applied in different areas of operation management research, such as production planning, capacity planning and manufacturing strategy (e.g. Tenhiälä 2011; Schroeder, Shah, and Xiaosong Peng 2011). It has most frequently been used by operation management researchers to study quality management systems and performance improvement (Larson & Foropon, 2018). While Zhao, Yeung, and Lee (2004) found that firm size, geographic scope of operation and environmental uncertainty impact organizations' adaptation of quality systems, Yeung, Edwin Cheng, and Kee-hung (2005) found the influence of cultural elements in quality management may be contingent on the operating environment.

Sila (2007) adopts contingency theory and institutional theory to study the influence of a variety of contextual factors on the operation of total quality management (TQM). The contingency factors include firm size and scope of operations. The institutional factors include implementation of tools, such as ISO 9000, and organizational location. More recently, Jayaram, Ahire, and Dreyfus (2010) found that industry type, organizational size and TQM duration moderate the impact of organizational culture and quality system design elements on product quality and customer satisfaction.

Another study reported that manufacturing performance is influenced by the combination of organizational structure and environmental uncertainty (Zhang, Lindeman, and Schroeder, 2012). Based on study of hundreds of UK manufacturers, Taylor and Taylor (2014) also found that size affects performance measurement system efficiency. Finally, Salimian, Rashidirad, and Soltani (2017) investigated two contingency factors: organizational size and culture, finding that larger

organizations with strong supply chain orientations yield higher conformance quality.

Figure 2 Literature Review of Contingency Theory

Authors	IVs	DVs
Zhao et al. (2004)	Organization Size; Geographic scope of operation; Environmental uncertainty	Organization's adaptation of quality system
Yeung et al. (2005)	The operating environment	Role of cultural elements in quality management
Sila (2007)	Firm size; Scope of operation; Implementation of management tool, such as ISO 9000; Organization location	Operation of total quality management (TQM)
Jayaram et al. (2010)	Industry type; Organization size; Total quality management duration	Product quality and customer satisfaction
Zhang et al. (2012)	Organizational structure; Environmental uncertainty	Manufacturing facilities' performance
Taylor and Taylor (2014)	Organization size	Performance measurement system efficiency
Salimian et al. (2017)	Organizational size; Culture	Conformance quality

Figure 2 summarizes a selection of contingency theory adoptions by operation management researchers. It is striking that organization size has been discussed in almost every paper. Other contingency factors have also been identified to have influence on operations management,

including: geographic scope of operations, organizational culture and structure, industry type, environmental uncertainty and total quality management duration.

The quality of an organization's sustainability report represents its environmental and social performance. Thus, contingency theory can be applied to study what factors influence on the quality of sustainability reports. Based on contingency theory, firm size and location are thought to be related to the quality of an organization's sustainability report. Further, ISO certification and third-party assurance, as organizational strategies, are also thought to impact the quality of sustainability reports.

2.3 Sustainability reports

Knowing the concept of corporate sustainability is necessary for understanding sustainability reporting (Bansaal, 2005). Corporate sustainability recognizes the importance of social and environmental goals, as well as economic goals (Massa, Farneti, & Scappini, 2015). Sustainability reporting means the process of collecting and summarizing information about an organization's sustainability behavior performance, often based on the "triple bottom line" (Elkington, 1998).

Sustainability reports serve two main purposes: (1) assessing an organization's performance towards sustainability; and (2) enabling stakeholders to be aware of the organization's economic, environmental and social aspects (Lozano, 2006). Thus, sustainability reports can be used in advertising and as information for stakeholders (Hedberg & Von Malmborg, 2003).

There are several things motivating companies to produce sustainability reports. For example, helping firms track operations and improve efficiency (Pati, Wan Ahmad, de Brito and Tavasszy, 2016). During the process of collecting information for reporting, companies might learn details they did not know previously (Hedberg & Von Malmberg, 2003). Reporting can also benefit companies' reputations (Kolk, 2010); increase competitive differentiation, as more sustainability information is disclosed (Treacy-Lenda, 2012); increase internal and external transparency to make employees feel engaged and improve relationships with stakeholders (Daub, 2007); and demonstrate adherence to regulations (Morhardt et al., 2002). Some folks even suggest publishing a sustainability report symbolizes a company's success (Gray, Adams & Owen, 2014).

Various groups read sustainability reports for different reasons. For instance, shareholders use sustainability reports as tools to collect information for investments and risks (Tate, Ellram, & Kirchoff, 2010). Indicators, such as GHG emissions and total number of days lost due to injury, are supervised by relevant organizational departments for environmental and social conservation. If limits are exceeded, fines may be paid to government agencies and profit will decline. NGOs and governments treat sustainability reports as a way to examine companies' environmental and social commitment and performance (Wilmshurst & Frost, 2000; Solomon & Lewis, 2002).

In the early 1990s, a few companies worldwide started to publish environmental reports separately (Roberts, 1991; Gray, Kouhy, & Lavers, 1995; Cerin, 2002). The United Nations

showed a strong interest in environmental reporting and stated that these corporate reports served as a main channel for companies to demonstrate their environmental management (Elkington & Robins, 1994). Along with more attention paid to sustainable development and increasing stakeholder interest in corporate social responsibility, companies began to convert their environmental reports into corporate sustainability reports (Hedberg & Von Malmborg, 2003). Today, these are often called sustainability reports. This has become a widespread practice. In 2002, more than 3,000 sustainability reports were published voluntarily (Krajnc & Glavič, 2005). The volume of reporting has been increasing, especially in Europe and Japan (Kolk, 2008). A KPMG (2008) survey showed that around eighty percent of the G250 (largest) companies released data about corporate sustainability. Such reporting is recognised as an essential factor of a company's contributions to sustainability (Morhardt, Baird, & Freeman, 2002).

With sustainability reporting becoming mainstream, there is debate about whether or not it should be mandatory. In Europe, an increasing number of countries make publishing sustainability reports mandatory; at least for firms of certain size or type of organization (Dilling, 2010). There is also legislation about sustainability reporting in specific countries, such as Belgium, the Netherlands and Finland. However, the European Union still encourages voluntary reporting. The EU knows producing sustainability reports takes extra work. Thus, making it mandatory would have the opposite result from the initial purpose of reporting, i.e. to optimize operations and attract more investments, especially for companies that are not equipped with the ability to spend extra resources on sustainability reporting. (Dilling, 2010).

In line with the increasing interest in sustainability reporting, some initiatives have been proposed to develop guidelines for reporting. Those guidelines can be divided to three categories: account, narrative assessments and indicator-based (Lozano, 2006). Among the three types, indicator-based assessments have more consistency, transparency and usefulness for decision-making (Lozano, 2006). The GRI Guideline is indicator-based assessment.

Significant development of sustainability reporting includes the formation of the World Business Council for Sustainable Development (<http://www.wbcsd.org/>), the Global Reporting Initiative (<https://www.globalreporting.org>) and the development of standards for environmental management systems, such as EMAS standards, the ISO series, and the Social Accountability 8000 Standard. (Krajnc & Glavič, 2005). Figure 3 shows a comparison among these reporting frameworks, including information about the main areas covered, advantages and disadvantages. GRI Guidelines are those used most widely today (Lozano, 2011). Of course, more than one guideline can be used in any given report. Empirical research has shown that companies adopting a reporting standard are more mature and committed to sustainability reporting, compared with those without a standard (Piecyk & Björklund, 2015).

SA 8000 certification is a management systems standard, established by Social Accountability International in 1997 to help certified organisations demonstrate their commitment to the fair treatment their workers receive. It measures eight areas that are important in social accountability: Child Labor; Forced or Compulsory Labor; Health and Safety; Freedom of Association and Right to Collective Bargaining; Discrimination; Disciplinary Practices;

Working Hours; Remuneration; and Management System (Sa-intl.org, 2018).

The AA1000 Framework is published by AccountAbility, a global consulting and standards firm. Currently AA1000 has three standards: AccountAbility Principles Standard, Assurance Standard and Stakeholders Engagement Standard. These series represent a practical way for organizations to apply principles of accountability, assurance and stakeholder recognition (AccountAbility, 2018).

ISO 14031 is a branch in ISO 14000. It is an environmental performance evaluation guideline that can be used by any kind of organization. Instead of paying attention to report writing, ISO 14031 focuses on selection of environmental indicators. However, it makes no recommendation about which metric should be chosen, but only provides information about 197 environmental topics (Morhardt et al., 2002).

Figure 3 Comparison between sustainability frameworks

Guideline	Focus area	Advantages	Disadvantages
ISO 14000 series (Especially 14301) and EMAS	Environment	Present a comprehensive introduction of environmental dimension. Recognized worldwide	Does not mention economic and social dimension
SA 8000	Social (mainly focuses on the human and labor rights)	Address human and labor right straight in the company	Does not consider economic and environmental dimensions of sustainability
AA1000 Framework	Social and Ethical	Focus on compliance innovation. Including	Complicated to put into practice.

		stakeholder management in the whole process	Does not consider economic and environmental dimensions
GRI Guidelines	Economic, Environmental, And social	One of the most comprehensive guidelines; Recognized worldwide	It cost a lot to collect all information needed in the guideline

Source: Lozano & Huisinigh (2011)

Empirical research has shown that companies adopting a reporting standard are more mature and committed to sustainability reporting, compared with those without a standard (Piecyk & Björklund, 2015).

The sustainability indicators used in the above-mentioned frameworks measure sustainability performance in different units. It is difficult to compare and make business decision with a large number of performance measurements (Krajnc & Glavič, 2005). Thus, a unified framework is needed for sustainability reports. GRI has become the leading authority on sustainability reporting with a widely accepted framework (Dilling, 2010). The question is: how to evaluate the quality of various reports given that many reports do not comply with a framework. Morhardt, Baird, & Freeman (2002) studied the world's 40 largest companies and found less than 20% of the content met GRI 2000 scoring system requirements. However, it is difficult to compare current sustainability reports in a comprehensive and meaningful way (ACCA, 2004).

Though published widely, sustainability reports still have shortcomings. Cerin (2002) finds

that there are inconsistencies between what reports show and the actual behavior of companies, and the quality of reports are uneven. Gray & Milne (2002) suggest companies should report their absolute contribution or deterioration at a industrial, regional or global level, to facilitate comparability. In addition, through publishing sustainability reports and linking them to corporate strategies, companies are hoping to improve risk management and long-term performance. Nonetheless, with the extra cost of taking CSR programs into practice, researchers doubt whether sustainability reporting can create an advantage for companies. Perhaps this can only be achieved when sustainability reporting is integrated fully into operations (Dilling, 2010).

Despite its weaknesses, sustainability reporting is still a major development for global companies (Stanny & Ely, 2008). Still, the number of companies producing reports is limited compared with the total number of companies operating in the world (Lozano & Huisinigh, 2011). Despite all the limitations, it is encouraging that more companies produce sustainability reports with the help of GRI. Now, a consistent and recognised method of rating reports is needed.

2.4 GRI

GRI was founded in late 1970s in Amsterdam, aiming to harmonize reporting standards and achieve current sustainable practices without compromising long-term development (Brown, de Jong, & Levy, 2009; Dumay, Guthrie, & Farneti, 2010). It was initially developed for corporations and then for any type of business, government agency or NGO. At first GRI only regarded environmental performance reporting as its main goal. In 1998 its scope was expanded

to include social and economic factors as well, in other words “all aspects of sustainability” (Willis, 2003). It also provides principles for defining report content and quality (see Appendices A and B). The priority for GRI is to make sustainability reporting transparent and become a regular organizational activity (Massa et al., 2015).

The latest version of GRI called G4 (fourth generation), developed in 2013, includes instructions on how to prepare a sustainability report. This guideline enables managers to understand a company’s sustainability situation, giving stakeholders information about process and outcome (Massa et al., 2015). GRI takes steps to guarantee that the updated guideline is most closely linked to current operations of corporations and represents what merits attention if pursuing a higher standard of sustainability. Representatives from different companies across various fields, researchers, consultants, NGOs and the United Nations Environment Program (UNEP) are involved in formulating the content of GRI (2006). It is free for anyone to become a stakeholder of GRI, and to provide ideas for revising the framework (Hedberg & Von Malmberg, 2003).

Companies adopt GRI as a guideline mainly because they want to increase the credibility of their sustainability report, since using GRI is regarded as the symbol of a good report (Gray et al., 2014). Another reason for companies to adopt GRI is that the guidelines can provide an established template to follow, including some indicators that may be new to the companies (Hedberg & Von Malmberg, 2003). Further, publishing a GRI report is regarded as a sincere commitment towards corporate sustainability (Dilling, 2010).

Compared with other guidance, GRI includes the widest range of topics (Lozano & Huisingh, 2011) and has become the dominant guide for companies to make reports (Farneti & Guthrie, 2009; Morhardt et al., 2002). As shown in Figure 4, GRI was used by more than 95% of companies to guide publishing reports in 2008. In 2006, nearly 1,000 firms in 60 different countries adopted GRI (Ballou, Heitger, Landes, & Adams, 2006; Toppinen & Korhonen-Kurki, 2013). In 2015, this number increased to 7,500 (Zahid & Ghazali, 2015).

Figure 4. Use of SR guidelines issued in 2008 as reported by corporateregister.com

SR Guidelines	Number of reports	Percentage of usage
AA1000AS	102	8.87
GC	199	17.30
GRI	1,093	95.04
2 Frameworks	214	18.61
3 Frameworks	15	1.30
Total Organizations	1,150	100.00

Source: Dumay et al. (2010)

Although GRI has gained wide acceptance and recognition, some analysts still criticize it, noting disadvantages they think need to be revised. Lozano and Huisingh (2011) suggest that GRI does not consider the time dimension, because it does not include comparison between the current situation of a company and its previous situation. A study analyzing sustainability reports from Australian food industries concludes that GRI should be adapted to specific industries (Guthrie, Petty, & Ricceri, 2007). Guthrie and Farneti (2008) revealed that most companies'

reports are fragmentary and only disclose some of the GRI indicators.

2.5 Rating sustainability reports

Evaluating the quality of reports includes assessing whether released information complies with what the framework requires. Morhardt, Baird & Freeman (2002) studied the world's 40 largest companies and found less than 20% of their report content met what the GRI 2000 scoring system requires. Other studies found that companies tend to disclose positive performance and avoid disclosing negative things (Criado-Jiménez, Fernández-Chulián, Larrinaga-González, & Husillos-Carqués, 2008; Holder-Webb, Cohen, Nath, & Wood, 2009), which conflicts with the GRI Balance principle.

Benchmarking sustainability reporting can have potential benefits. It can inform stakeholders in a clear and systematic way of the quality of reports. It also helps companies be aware of the how well they communicate with stakeholders, and to make comparisons with peers (Skouloudis, Evangelinos, & Kourmousis, 2009). Despite the advantages of benchmarking sustainability reporting, few studies specifically evaluate sustainability reporting quality (Hahn & Kühnen, 2013). Further, the methods proposed by scholars to evaluate report quality are limited.

A number of studies have created ways to rate or grade sustainability reports. In 1997, Davis-Walling & Batterman (1997) used a scale of 0, 1 and 2 to evaluate Fortune 50 companies' environmental reports made in 1994 in terms of 29 topics {0 = not mentioned, 1 = topic

generally mentioned, 2 = specific information mentioned}.

SustainAbility and UNEP devised a numerical tool for rating reports, expanding the score range from 0 to 4 points. In the most updated version, the assessment approach includes 29 criteria, which are divided into four main parts: management, strategy and governance, accessibility and assurance, presentation of performance (Skouloudis et al., 2009). Each criterion is assigned a score from 0 to 4 points: 0 = not mentioned; 1 indicates information is “sketchy;” 2 means information is systematic; 3 is assigned to extensive information with no major gaps; 4 means that coverage is integrated and related to core processes.

Kolk (1999) did a comparison between three systems: UNEP/Sustainability, Deloitte Touche Tohmatsu and Tomorrow magazine. Tomorrow magazine is a qualitative rating system. It assigns one star to poor/inadequate content, while five is comprehensive/excellent content. The conclusion comes from summing the total number of stars (Kolk, 1999).

Deloitte Touche Tohmatsu proposed a sustainability reporting scorecard as a way for organizations to self-assess and rate their reports (Tohmatsu, 2006). This scorecard mainly evaluates a report’s ability to communicate effectively, instead of the quantitative information it releases. Deloitte has used this method mainly in three industries: mining, automotive and pharmaceutical. This scorecard consists of 30 criteria, grouped into six categories: effective communication, management quality and commitments, relevance of information, organization’s sustainable development agenda, performance and credibility. A rating of 0 to 4 points is assigned to each criterion, from “not mentioned” to “best practice.”

Clausen, Loew and Westermann (2005) evaluated environmental reports published during 1994-2000 in Germany. Their method includes 13 main criteria, and each of these has its own sub-criteria. There are 48 criteria in total. A rating scale of 0 to 5 is used: 0 means no fulfillment of requirements; 1 means poor fulfillment; 3 means good fulfillment; and 5 indicates exceptional fulfillment. The total points are divided by the number of sub-criteria, and then multiplied by a weighting factor.

Morhardt et al. (2002) invented a scoring system in accordance with the first version of GRI guidelines. They used it to rate 40 environmental reports published in 1999 from the largest multinational companies, along a range from 0 to 4. More specifically, a rating of 0 indicates no information is mentioned in the report; 1 indicates that anecdotal or brief information is released; 2 indicates that limited information is provided; if a topic is discussed fully, a rating of 3 is assigned; and information beyond GRI requirements earns a 4 rating.

The Canadian consulting firm Stratos Inc. used a scale of 0-3 points to evaluate Canadian companies. They added several new criteria, including how companies manage relationships and engagement with indigenous groups (Skouloudis et al., 2009).

de la Cuesta & Valor (2013) rated each indicator of Spanish companies listed in the IBEX-35 stock with a score of 0-4 and found that companies in higher reputation risks are more likely to have higher quality sustainability reports. Hąbek (2014) also used a scale of 0 to 4 to rate 32 Polish companies' reports and found that sustainability reporting is still in its early stage. Within the sample, 60% of reports were prepared with GRI's instruction.

The Graphical Assessment of Sustainability in Universities (GASU) tool was made based on the GRI 2002 Guidelines to assess universities' sustainability reports (Lozano, 2006). Though more quantitative and objective, it uses a scale of 0-3 to rate reports {0 = absence of information in the report; 1 = around 25 per cent of the information required is provided; 2 = around 50 per cent of the information required is released; 3 = more than 75 per cent of the full information is provided}.

Yadava and Sinha (2016) adapted a scoring system for Indian business: a rating of 0 indicates a specific indicator is not mentioned; 1 means brief information is provided, such as “company does not have child labor”; if detailed information with no more than 1 year data is given, a rating of 2 is assigned; 3 indicates full information with more than 1 year data released in comparable form. This method takes consistency of performance into consideration, which is in accordance with the GRI Comparability Principle. Compared with this method, the rating system developed in this thesis has broader coverage that evaluates quality in completeness, balance and clarity, not only comparability.

Figure 5 Literature review on scoring system

Author	Method
Davis-Walling& Batterman (1997)	A scale of 0, 1 and 2 was used to rate those reports. 0: not mentioned; 1: topic generally mentioned and 2: specific information mentioned
Morhardt et al. (2002) de la Cuesta& Valor (2013) Habeck (2014)	A range of 0 to 4 is used to those reports
Clausen et al. (2005)	A rate scale of 0 to 5 is used: 0 means no fulfillment of requirements; 1 means poor fulfillment; 3 means good fulfillment; and 5 indicates exceptional fulfillment. As a result, the total point were divided by the number of sub-criteria, multiplied by weighing factors
SustainAbility in association with UNEP (2006)	A score from 0 to 4 points: 0 means not mentioned; 1 indicates the information is sketchy; 2 means information is systematic; 3 is assigned to extensive information with no major gap; 4 means that the coverage is integrated and related to the core processes.
Deloitte Touche Tohmatsu (2006)	A rate of 0 to 4 points is assigned to each criterion, from “not mention” to “best practice”
The Canadian consulting firm Stratos Inc (2009)	A scale of 0-3 points (Including how company manages the relationship and engagement with indigenous groups)
Yadava and Sinha (2016)	A rating of 0 indicates a specific indicator is not mentioned; 1 means brief information is provided, such as “company does not have child labor”; if detailed information with no more than 1 year data is given, a rating of 2 is assigned; 3 indicates a fully information with more than 1 year data released in comparable form.

Figure 5 is a literature review on existing scoring system. While all the aforementioned

scoring systems provide insights into the quality of sustainability reporting, certain weaknesses still exist. The scoring systems differ in the scale of rating. However, they all have a similar shortcoming. Whether they were designed based on GRI or not; words they use to determine the content quality are ambiguous, such as “general”, “brief”, “sketchy” and so on. Different people may have different understanding and measurements for them. Thus, the results may not be reliable and replicable.

2.6 Determinants of sustainability report quality

Several scholars have tried to find the determinants of sustainability report quality. Using “determinant” and “sustainability report” or “corporate social responsibility disclosure” as search terms in the abstracts yielded 65 articles during an ABI/Inform database search.

Dilling (2010) analyzes 124 quantitative and qualitative variables. Their results show that companies located in Europe, participating in the energy or producing sectors, and with higher profit margins are more likely to have high quality sustainability reports. Hawani Wan Abd Rahman, Mohamed Zain and Hanim Yaakop Yahaya Al-Haj (2011) assessed 44 government-linked companies’ sustainability disclosures and found that company size is positively related to the disclosure.

Michelon (2011) employs legitimacy theory to discuss the impact of company’s reputation on sustainability disclosure. The concept of reputation is divided into three dimensions: commitment to stakeholders, media exposure and financial performance. They found the first

two determinants are positively related to the extent of sustainability disclosure. In a study comparing reports of companies listed on the Amman Stock Exchange, companies of larger size, with longer history and maintaining growth in assets tend to voluntarily disclose more social responsibility information. (AL-Shubiri, Al-Abedallat, & Orabi, 2012).

More recently, de la Cuesta and Valor (2013) uses a rating system to score Spanish companies. They found that international companies involved in operations with higher reputation risks disclose the highest level of content. In their study of annual reports from 800 A-share listed firms on Shanghai Stock Exchange, Wang, Song and Yao (2013) found that firm size, media exposure, institutional shareholding and share ownership concentration is positively associated with corporate social responsibility disclosure. Institution shareholding percentage is equal to the ratio of shares held by institutional investors, while ownership concentration represents the ratio of shares held by the largest shareholder.

Legendre and Coderre (2013) analyze sustainability reports from the world's 500 largest companies to identify what factors influence the GRI application level. Their result shows that industry is relevant to the GRI application level. Amran, Periasamy and Zulkafli (2014) use content analysis to analyze sustainability reports and annual reports from 10 industries and find that firm practices in obtaining environment certification and the proportion of independent non-executives on the board of directors will increase the climate change disclosure in sustainability reporting.

Fontana, D'Amico, Coluccia and Solimene (2015) studied environmental disclosure from

companies listed in the Milan Stock Exchange. They suggest ownership structure, industry and firm size have impact on the disclosure. Habbash (2016) examined 267 annual reports from Saudi non-financial listed firms and concluded that firm ownership, firm size, and firm age are positively associated with CSR disclosure.

Analyzing 97 sustainability reports and annual reports of Brazilian companies, Vogt, Hein, da Rosa and Degenhart (2017) aim to find the relationship between several factors on environmental disclosure. Their results show that size, audit and coherence with GRI are positively associated with disclosure. Chakroun, Matoussi, and Mbirki (2017) found that firm age, financial performance and state shareholding are the major determinants that have influence on corporate social responsibility disclosure, from an analysis of Tunisian listed banks' annual reports.

CHAPTER 3: DEVELOPMENT OF HYPOTHESES

Firm size

Firm size is a common variable in strategy research, including studies guided by contingency theory. Some scholars suggest this is the most influential variable in determining the quality of sustainability report (Adams, Hill, & Roberts, 1998). Because of their widespread and substantial transactions, large companies have more stakeholders that participate in managing company operations and are under sustainability related pressures (Hart & Sharma, 2004). Since sustainability reports are a way to report to stakeholders, large companies try to make their reports as comprehensive and detailed as possible, which results in better quality reports. In addition, larger firms presumably have more human resources and larger budgets, enabling them to devote more effort to sustainability reporting and creating better quality reports (Andrews, 2002; Gallo & Christensen, 2011). Companies with revenue of more than \$50 billion (US) were twice as likely to produce sustainability reports, compared to companies with revenue less than \$1 billion (KPMG, 2011). In contrast, one study found that firm size has no relation with sustainability disclosure (Davey, 1985). Guthrie and Mathews (1985) criticized this study due to its small sample. Consistent with most studies' conclusion, the first hypothesis is:

H1: Large firms are more likely to produce high quality sustainability reports, compared to small firms.

Location

Opinions about location influencing the quality of sustainability reports vary. Some argue that country in which the company's headquarters is located is related to sustainability reporting (Dilling, 2010), because different political systems and national cultures influence the extent and format of reporting (Kotonen, 2009). Furthermore, European companies are believed to have higher standards of sustainability reports. Mock, Stroh, and Swartz, (2007) studied 130 reports and found 67% of assured reports are from the European Union. More countries in Europe are also making sustainability reporting compulsory and have enacted legislations for it (Dilling, 2010). Finland, Sweden, Belgium, Germany and the Netherlands have sustainability reporting legislation for certain company categories (Delbard, 2008). Thus, it is reasonable to assume European companies have better quality sustainability reports. On the other hand, some scholars argue that country of operation has no relationship with quality of sustainability reports (de la Cuesta & Valor, 2013; Dilling, 2010). Cormier and Magnan (2003) assert that sustainability reporting is not different across countries because of globalization. Nonetheless, inspired by Dilling (2010) and Mock et al. (2007), the second hypothesis is –

H2: Location of company headquarters affects sustainability report quality

ISO (International Organization for Standardization)

There is a possibility that sustainability reports guided by GRI from companies with ISO certification are of higher quality compared with those from non-ISO certified firms. ISO is an

international body with representative standardization from numerous national organizations (<https://www.iso.org/about-us.html>). While ISO 14031 is a comprehensive guideline in environmental reporting, providing a list of 197 topics that could be selected by companies for environmental management (Morhardt et al., 2002); ISO 26000 standardizes definitions about social responsibility (Schwartz & Tilling, 2009), providing guidance for corporations to integrate social responsibility into companies' operation (Hahn, 2013). Thus, reports using both GRI and ISO as guidelines (or GRI guided reports from ISO certified firms) should have broader coverage and deeper analysis on the environmental and social dimensions, while reporting content of the economic dimension at least remains the same. Furthermore, GRI is designed to be applicable to ISO (GRI, 2010), which means that GRI and ISO can be supplementary to each other, resulting in a higher quality of report if used in combination. Therefore, the third hypothesis is:

H3: Companies using ISO and GRI produce higher quality sustainability reports, compared to companies using only GRI.

Third-party verification

Given the variability in quality of sustainability reports, stakeholders, analysts and customers doubt the reliability, materiality and comparability of sustainability disclosures. External assurance is regarded as a way to bridge the credibility gap (Manetti & Becatti, 2009). One of the reasons for assurance is to increase recognition and confidence of stakeholders (GRI, 2013a). If reports have positive assurance or third-party verification, companies are more likely to gain

trust of report readers. It is likely that companies willing to use assurance services have high quality sustainability reports. Otherwise bad judgments from assurance firms will lower their reputation and increase costs. Consistent with this, Perego (2009) performed a content analysis of 136 companies that are listed in the 2005 ACCA Sustainability Reporting Award to find out that assurance from big-4 accounting firms positively influenced the quality of reports in terms of reporting format. Reports assured by big-4 accounting firms have an integrated reporting framework. Based on the verification literature, the fourth hypothesis is –

H4: Third-party audited sustainability reports are of higher quality.

CHAPTER 4: METHODOLOGY

This study gathers secondary data, directly from companies' sustainability reports, to create a database. The rating method developed to rate reports is based on the following four GRI principles: completeness, balance, comparability and clarity. These are defined in Appendices A and B. Other GRI principles are not evaluated in the current study due to special measurement challenges. For example, regarding reliability and accuracy, it would be very difficult to identify whether information in the reports is true or expressed accurately, without having access and analyzing the research behind the information.

4.1 Sample selection

The complete GRI list forms the population from which a sample of companies is drawn. It contains companies publishing sustainability reports from 1999 to 2017, along with information including company name, size, sector, country, report title, external assurance, report html, address and so on. This list does not include all reports in the world that use GRI as guidance. It only includes companies that report to GRI on their own behaviors. However, the number of companies is still large. In 2015, 2,445 companies that use GRI as guidance are on the list. Because the list is published by GRI, which has a wide recognition, this is the sample source.

4.2 Measurement of variables

4.2.1 Independent variables

Based on the hypotheses, there are four independent variables for which indicators are needed. For firm size, all companies on the GRI list are grouped into SME (small and medium-sized enterprises), large enterprise and MNE (multinational enterprises). The definition GRI uses to classify companies is based on the EU guidelines (see Table 1). An alternative, quantitative measure of company size is simply the number of employees. Location is divided into three regions: North America, Asia and Europe. Most firms with the ability to produce sustainability reports are headquartered on these three continents. Measurement for ISO is the same as for third-party assurance, binary with yes/no categories. Note: ISO was not considered when selecting samples, since doing so would reveal the percentage of firms that were both ISO-certified and using GRI guidelines in sustainability reporting. Whether the firm has third-party assurance was identified from the GRI list; and the *keyword* “ISO” was used to search each report for evidence on whether the firm is ISO-certified.

Table 1. EU Definition to Classify Company Size

Category	Headcount	Turnover	Assets
SME	< 250	≤ € 50 million	≤ € 43 million
Large	≥ 250	> € 50 million	> € 43 million
MNE	≥ 250 and multinational	> € 50 million	> € 43 million

Source: Sustainability Disclosure Database Data legend

The above-mentioned categories result in $3*3*2 = 18$ combinations of levels of the independent variables, based on size, location and assurance. The complete list of combinations is presented in Table 2. To be statistically sufficient, at least five observations per cell are needed in the sample (Hair, Black, Babin, & Anderson, 2010). Thus, a stratified sample of $18*5=90$ companies is needed. All reports are for the year 2015 because the collection of reports for the year 2016 had not been accomplished when the study started. One additional restriction was used in sample selection: there had to be a GRI index at the end of each report to guide readers where relevant content is in accordance with GRI indicators. This requirement facilitates use of the methodology for rating reports. In addition to the other items, each report was classified on whether the firm is ISO certified or not, and notes are taken for this. Ultimately, there are 62 firms in the sample because small companies rarely produce sustainability reports, making it hard to find as many small firms as planned. Also, no large European companies without third-party assurance could be found. The sample size includes 7 small firms, 25 large firms and 30 multinational firms. There are 25 companies located in North America, 15 companies in Europe and 22 companies in Asia. A total of 31 have third-party verification, while 31 do not. Finally, 25 companies use GRI but are not ISO certified and 37 companies use GRI and are certified. Table 3 shows the number of different ISO certifications reflected in sample.

Table 2. Summary of Combinations of Independent Variables

Number	Size	Location	Assurance
1	M	NA	Yes
2	M	NA	No
3	M	A	Yes
4	M	A	No
5	M	EU	Yes
6	M	EU	No
7	L	NA	Yes
8	L	NA	No
9	L	A	Yes
10	L	A	No
11	L	EU	Yes
12	L	EU	No
13	S	NA	Yes
14	S	NA	No
15	S	A	Yes
16	S	A	No
17	S	EU	Yes
18	S	EU	No

*M = MNE; L = large; S = small; **A = Asia; EU = Europe; NA = North America

Table 3. Number and Types of ISO Certifications in the Sample

Series	ISO	Number
14000	14001	19
	14000	2
	14064	3
	14065	1
	14040	4
	14044	1
9000	9000	1
	9001	12
Others	10002	1
	13485	1
	16949	1
	17025	1
	18001	3
	20121	1
	22000	1
	22301	1
	27001	1
	31000	1
	50001	5

As stated above, based on firm size, the companies are classified as multinational, large and small. However, there is not much difference in headcount and turnover between multinational and large firms as shown in Table 1. Thus, numbers of employees are used to represent firm size, which becomes a continuous independent variable. Data for numbers of employees come from the Wikipedia website, companies' annual reports and sustainability reports.

4.2.2 Sustainability Reports Rating

In this study, content analysis is used for grading sustainability reports. As stated in the

literature review, ranking systems used in previous studies have their shortcomings. To create a better rating system, measures are developed that takes into account both width and depth of disclosure reports.

This study focuses only on the social aspect of the reports given the fact that this methodology is complicated and time-consuming. However, the results still represent the quality of companies' sustainability reports. Companies tend to focus on the economic dimension rather than environmental and social dimensions (Searcy & Buslovich, 2014). Moreover, Rao (2012) counted number of categories in assured reports and found compared with environmental aspects, social aspects are reported less. Thus, this thesis addresses the relatively light study of the social dimension of sustainability.

Because this study only focuses on sustainability reports prepared based on GRI guidelines, the GRI Implementation Manual is the reference for evaluation. GRI has its own principle for defining report content and quality, and some of these principles are adopted; those that are most suitable for quantitative measurements. The principles adopted are: completeness, balance, comparability and clarity. This study develops different rating systems for each of them. The scores are the dependent variables used to test the hypotheses. The principles of stakeholder inclusiveness and timeliness are also considered in analyzing companies' reports.

GRI's explanation for completeness is the extent of coverage of a company's performance. The index at the end of each report is the reference to rate reports. If the index shows that an indicator is covered in the report, the report earns a score of 1; if an indicator is not covered, the

report earns a score of 0. The final completeness variable is percentage of coverage, which comes from the total score divided by 48, the total number of social indicators, multiplied by 100 to become a percentage. To be accurate, the positions of all indicators are checked one by one, aided by the index, and a score of 0 is given if actual reporting is absent despite what the index shows. Appendix D presents an example of calculating this measure of completeness.

Balance requires companies to report both positive and negative performance, enabling readers to make reasonable assessments of overall performance. The method rates reports by judging whether a good or bad impression of the company is implied for each indicator. The resulting index equals the number of bad impression indicators, divided by the total number of indicators reported. However, without defined criteria, people have different measurements to determine positive and negative performance. To ensure consistency and increase credibility, rules are made before rating for balance.

One example is the indicator related to gender. For instance, LA1: “Total number and rates of new employee hires and employee turnover by gender.” Only if the ratio between female and male is 1:1 (allowing for 5% difference), is performance rated positive, and vice versa. Thus, reporting is “balanced” if the range is within the limits of 1.05:1 and 1:1.05.

Other indicators are more straightforward, e.g. asking whether companies have retirement benefits or give charity donations. For instance, LA2: “Benefits provided to full-time employees that are not provided to temporary or part-time employees.” In this case, having any kind of benefits leaves a good impression.

Except for those less subjective indicators, some indicators are very ambiguous. For example, LA4: “return to work and retention rates after parental leave, by gender.” It is hard to define an exact percentage between good retention rates and bad retention rates. The performance of one company should be compared with the average rate to determine whether this indicator is relatively positive or negative. Therefore, for each ambiguous indicator, all numbers reported by various companies are compared with the mid-point, which is the median of all numbers. Numbers greater than the mid-point are termed “good” and those less than the mid-point are “bad.” In order to be more credible and decrease the bias from subjective judgments of ambiguous indicators, an alternative method is to remove all ambiguous indicators to create a new dependent variable. Appendix D also presents an example of calculating this measure of balance.

Regarding comparability, GRI requires companies to report in a consistent way, which enables comparison of performance across multiple years. It helps stakeholders analyze changes in the company and determine whether it is making progress or falling back, ultimately for the purpose of making informed investment decisions. Therefore, comparability is rated by giving a score of “3” to data of three or more years’ performance; “2” to data of two years; score “1” to data from this year only; score “0” if the item is not reported. The result is the sum of all indicators’ scores for a given company. Again, an example of calculating this measure is shown in Appendix D.

Clarity asks companies to report in a way that is accessible and understandable. In

accordance with the principle, a score of 1 is given to an indicator that is easy to understand, and a score of 0 is given to the indicator that is ambiguous and confusing. The result equals the sum up of all indicators' score, divided by the total number of indicators reported, for a given company. See Appendix D for an example of calculating clarity.

GRI requires companies to identify their stakeholders, and explain how they respond to these stakeholders' expectations. Companies should have a clear goal of what they want to achieve in response to stakeholders' expectations, and have a plan to meet the expectations. In response to this principle, this study summarizes the most common stakeholders for all firms in the sample. For Timeliness, companies are supposed to report on a regular schedule, e.g. annually. GRI wants firms to reveal their routine of producing sustainability reports, showing the importance of the reporting process. Most of the companies in the sample produce sustainability reports annually.

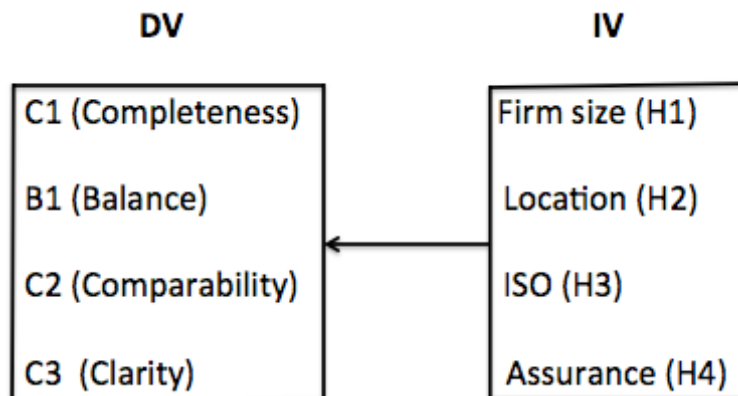
CHAPTER 5: DATA ANALYSIS AND DISCUSSION

SPSS statistical software is used to test the hypotheses in this study. Bivariate correlations, cross-tabulations, multivariate analysis of covariance (MANCOVA), means and correlations were used to identify relationships between the variables.

5.1 Data analysis

As Figure 6 shows, there are four independent variables (firm size, location, ISO and assurance) and four dependent variables (completeness, balance, comparability and clarity) in the initial model.

Figure 6. Initial Model



Before hypothesis testing, bivariate correlation was used to assess the relationship between the two measures of balance (B1 and B2). B1 rates all indicators based on the criteria, while B2 removes all ambiguous indicators and only rates the less subjective indicators (such as LA7:

“Workers with high incidence or high risk of diseases related to their occupation”). Is LA7 an example of a subjective indicator? As shown in Table 4, the two measures are highly correlated (Pearson correlation = 0.943; p-value = 0.000). Thus, only B1 is used for hypothesis testing, and B2 is dropped.

Table 4. Correlation between Measures of Balance (B1 and B2)

Indicator	B1	B2
B1	1	.943 (.000)
B2	.943 (.000)	1

N = 62

P-values in parentheses

Cross-tabulation was used to test the relationship between ISO and assurance, both 0/1 variables. These indicators were found to be highly correlated (Chi-square=5.429; p value= 0.01), as shown in Table 5. Therefore, assurance is removed from the set of independent variables. This also makes practical sense, as third-party audits and assurance are part of ISO implementation.

Table 5. Crosstab between Assurance and ISO

		ISO		Total
		0	1	
Assurance	0	17	14	31
	1	8	23	31
Total		25	37	62

Chi-square =5.429 (p value=0.01)

MANCOVA was used to test the relationship between the independent variables and the dependent variables. As shown in Figure 7, location is not significant for any of the dependent variables, perhaps due to the globalization of business. This provides support to H2. Thus, location is removed from the independent variables. Furthermore, balance and clarity are not influenced by any of the independent variables, perhaps due to their subjective measurements. Due to their lack of significance, these two are removed from the dependent variables.

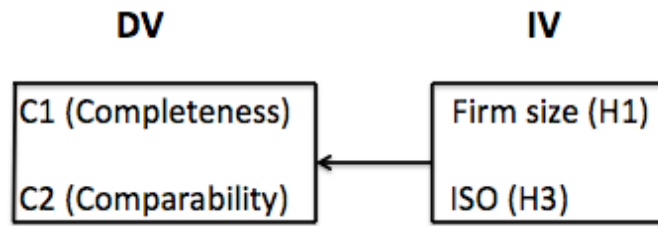
Figure 7. Initial MANCOVA Results

Independent variables	Dependent variable	Sig	Partial Eta Squared	Observed Power
Size	C1	.017*	.095	.672
	B1	.630	.004	.076
	C2	.021*	.090	.644
	C3	.551	.006	.091
Location	C1	.875	.005	.070
	B1	.724	.011	.099
	C2	.948	.002	.058
	C3	.462	.027	.177
ISO	C1	.002*	.149	.875
	B1	.111	.044	.357
	C2	.001*	.188	.947
	C3	.730	.002	.063

Computed using alpha= .05

After removal of several variables, as explained above, the final model is shown in Figure 8.

Figure 8. Final Model



MANCOVA was again used to test the relationships between the independent variables and dependent variables. As Figure 9 shows, size has a significant influence on quality in terms of completeness (p-value=0.008) and comparability (p-value=0.009). ISO has a significant impact on these dependent variables as well: for completeness, p-value=0.020 and for comparability, p-value=0.007. Effect sizes of both firm size and ISO on completeness and comparability are around 0.10, i.e. “weak;” while observed powers are approximately 0.70, slightly below the standard of 0.80.

Figure 9. MANCOVA Results: Final Model

Independent variables	Dependent variables	Sig	Partial Eta Squared	Observed Power
Size	C1	.008*	.116	.776
	C2	.009*	.113	.761
ISO	C1	.020*	.089	.651
	C2	.007*	.117	.779
Size*ISO	C1	.143	.037	.309
	C2	.118	.042	.344

Both firm size and ISO are found to have a significant influence on report quality, in terms of completeness and comparability. Correlation and means are used to identify the direction of these relationships. As Table 6 shows, correlations between firm size and the two dependent variables are both positive, demonstrating the positive effect of firm size. Table 7 reveals that the ISO group scores significantly higher than the group without ISO, showing that ISO is positively linked to report quality, in terms of completeness and comparability.

Table 6. Correlations of Firm Size with Completeness and Comparability

	Pearson Correlation
C1	.238
C2	.218

Table 7. Mean Differences, with and without ISO

Dependent variable	ISO	Mean
C1	0	.263
	1	.447
C2	0	24.670
	1	43.677

5.2 Discussion

Sustainability reports were evaluated in terms of completeness, balance, comparability and clarity. Thus, higher report quality means a report covers more indicators; a balance of indicators revealing positive and negative performance; consistently-reported indicators, with more years' information provided; and the report is clear and easy to understand.

Hypothesis 1: Large firms produce high quality sustainability reports, compared to small firms.

The results support H1 in terms of completeness and comparability. Large firms are more likely to produce sustainability reports covering a wider range of social indicators and report more years' data. This may be because larger firms have more stakeholders to monitor their operation, and it is the company's responsibility to present its performance comprehensively, enabling stakeholders to make investment decisions. With more resources and capital, large firms also have the ability to produce sustainability reports with abundant content.

Hypothesis 2: Location of headquarters does not affect sustainability report quality

H2 asserts that location has no relationship with the quality of report. The results support H2 for completeness and comparability, as well as balance and clarity (see Figure 7). Perhaps it is attributable to globalization, as Cormier and Magnan (2003) suggest; increasing exchange of information and decreasing differences across countries and continents. This explains a lack of difference in the quality of sustainability reports in Asia, Europe and North America.

The results for H2 are in accordance with those of Dilling (2010) and de la Cuesta & Valor (2013), but in contrast with others (e.g. Gray et al., 1995; Kotonen, 2009). Even mandatory sustainability reporting in Europe cannot guarantee good reporting quality. Perhaps countries adopting mandatory reporting should pay more attention to the quality of reports, not just the goal to publish one.

Hypothesis 3: ISO-certified firms produce higher quality sustainability reports, compared with non-ISO-certified firms.

The independent variable is ISO certification. MANCOVA results for both completeness (p-value = .020) and comparability (p-value = .007) support H3. Sustainability reports by ISO certified firms cover more indicators and present indicators more consistently. As stated above, though the ISO 14001 series neglects economic and social reporting, it is (arguably) the most comprehensive standard in environment reporting (Morhardt et al., 2002). Thus, reports from ISO certified firms are of higher quality.

In addition to testing the hypotheses, data was collected on report timeliness and stakeholder inclusiveness. More than 90% of the 62 sampled reports are produced annually. The rest are produced biennially or periodically (by newly founded firms that produced just two or three reports so far). Employees, customers, shareholders, other supply chain members, policymakers, NGOs, communities, learning institutions, media, and analysts are the stakeholders that companies commonly recognize, regardless of firm size, location, verification or use of ISO.

CHAPTER 6: CONCLUSION

To identify the relationship between companies' characteristics and the quality of sustainability reports, and to develop a standardized rating system, this study applies contingency theory to sustainability report research and invents a rating system based on the following GRI characteristics: completeness, balance, comparability and clarity. The results show that firm size and ISO certification positively influence the completeness and comparability of sustainability reports. Larger firms are more likely to produce sustainability reports that contain more indicators and report those indicators with consistent information released. Sustainability reports from ISO-certified firms are also of higher quality in completeness and comparability compared with reports from firms without ISO. Firm location has no relationship to quality of sustainability reports, perhaps due to globalization of business. Finally, report quality, in terms of balance and clarity, are not influenced by any of the independent variables, possibly because of the subjective measurements of these quality indicators.

6.1 Contribution

This thesis applies contingency theory for the first time in research related to sustainability reports. It empirically assesses the influence of firm size, location and ISO certification on the quality of sustainability reports. The results can help managers and workers responsible for producing sustainability reports to benchmark best practices and improve their own reports.

Furthermore, the quantitative assessment of sustainability reports based on GRI principles could directly help investors, customers and other stakeholders to compare companies and make more informed decisions.

6.2 Limitations of the Study and Areas for Future Research

There are some limitations of this study. First, the sample is small, especially the sample of small firms. A similar study with a larger sample size could counteract this limitation and yield larger effect size and power results.

Secondly, there is the possibility of bias in the scores for balance and clarity with their subjective measurements, because different people may have different judgments towards the same document. A more objective and quantitative method to evaluate balance and clarity could reduce such bias. For instance, for balance, an alternative metric could be the absolute value of the difference between the number of good impressions and the number of bad impressions, divided by the total number of indicators reported.

Thirdly, the scoring system developed in this study focuses only on social indicators. Future research can expand the scope to rate all aspects—economic, environmental and social. Further, GRI includes additional principles beyond the four discussed in this thesis. Future research can expand the rating system to evaluate reports using other characteristics of report quality. Finally, the set of independent variables could be expanded upon to identify additional predictors of sustainability report quality.

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Appendices

Appendix A. Principles for defining report content

Stakeholder inclusiveness – The organization should identify its stakeholders, and explain how it has responded to their reasonable expectations and interests.

Sustainability context – The report should present the organization’s performance in the wider context of sustainability.

Materiality – The report should cover Aspects that:

- Reflect the organization’s significant economic, environmental and social impacts; or
- Substantively influence the assessments and decisions of stakeholders

Completeness – The report should include coverage of material Aspects and their Boundaries, sufficient to reflect significant economic, environmental and social impacts, and to enable stakeholders to assess the organization’s performance in the reporting period.

<https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf>

Appendix B. Principles for defining report quality

Balance – The report should reflect positive and negative aspects of the organization’s performance to enable a reasoned assessment of overall performance.

Comparability – The organization should select, compile and report information consistently. The reported information should be represented in a manner enables stakeholders to analyze changes in the organization’s performance over time, and that could support analysis relative to other organizations.

Accuracy – The reported information should be sufficiently accurate and detailed for stakeholders to assess the organization’s performance.

Timeliness – The organization should report on a regular schedule so that information is available in time for stakeholders to make informed decisions.

Clarity – The organization should make information available in a manner that is understandable and accessible to stakeholders using the report.

Reliability – The organization should gather, record, compile, analyze and disclose information and processes used in the preparation of a report in a way that they can be subject to examination and that established the quality and materiality of the information.

<https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standa>

-Disclosures.pdf

Appendix C. Sample list

No.	Company Name
1	Du Pont
2	3M
3	UPS
4	Pepsi
5	Whitewave Foods
6	FedEx Corporation
7	Lexmark
8	Ernst&Young USA
9	Starwood Hotels and Resorts
10	Thermo Fisher Scientific
11	FIAT CHRYSLER AUTOMOBILES (FCA)
12	Carlsberg Group
13	Johnson Matthey
14	Neste Oil
15	TNT Express
16	Sonova
17	PHOENIX Group

- 18 OSRAM
- 19 Motor Oil Hellas
- 20 Amer Sports
- 21 Canon
- 22 Air China Limited
- 23 Formosa Plastics Corporation
- 24 Japan Tobacco
- 25 Samsung
- 26 Giantplus Technology Corporation
- 27 Mechema Chemicals Int Corp.
- 28 KPMG Sustainability Singapore
- 29 Leighton 3, India and Offshore Group
- 30 Thai Airways International Public Company Limited
- 31 Bank of America Corp.
- 32 Delta Air Lines
- 33 Dow Chemical
- 34 Waste Management
- 35 CSX Corporation
- 36 Macerich
- 37 Northrop Grumman

38	Nike
39	The Co-operators
40	Promega
41	ASML
42	Delta Holding
43	Gestamp
44	Lotus Bakeries
45	Red Electrica de España
46	SingTel - Singapore Telecommunications Limited
47	Taiwan Sugar Corporation
48	MTR Corporation
49	Dr. Reddy's Laboratories India
50	Atlas Honda Limited
51	Asia Polymer Corporation
52	China Pacific Insurance
53	Dubai Customs
54	Singapore Airlines Limited
55	Hainan Airlines
56	Avalon Advanced Materials
57	CalStrs

- 58 Newsun Resources
- 59 Farm Credit Canada
- 60 Crossville Inc
- 61 The Zuellig Family Foundation, Inc.
- 62 KSA (Korean Standards Association)

Appendix D. Example of rating system with DuPont's sustainability report.

1. Completeness

Step 1: Using the index at the end of the report for reference, put a "Y" (yes) in the table if the indicator is listed as included in the report; otherwise put a "N" (no) in the table. As Table D1 shows, except for LA7, all indicators are claimed to be included in the report.

Table D1. Index in DuPont’s report

LABOR PRACTICES AND DECENT WORK (OECD/UNGC)		
Employment	G4-LA1	32
	G4-LA2	33
	G4-LA3	34
Labor/Management Relations (UNGC)	G4-LA4	34
Occupational Health and Safety (OECD)	G4-LA5	35
	G4-LA6	35
	G4-LA7	
	G4-LA8	34
Training and Education (OECD)	G4-LA9	36
	G4-LA10	36
	G4-LA11	36
Diversity and Equal Opportunity	G4-LA12	38
Equal Remuneration for Women and Men	G4-LA13	38
Supplier Assessment for Labor Practices	G4-LA14	42
	G4-LA15	42
Labor Practices Grievance Mechanisms (OECD)	G4-LA16	34

Step 2: Use the index as a reference to find the pages for each indicator. Check whether the content is truly reported or whether or not what is reported meets the requirement. If it is not reported as it is claimed to be, a red “N” will be marked. The table should be like Table D2.

Table D2. DuPont’s result in Completeness

Character	MNY1
Company Name	DuPont
Coverage of material aspects	
LA1	Y
LA2	Y
LA3	N
LA4	Y
LA5	Y
LA6	Y
LA7	N
LA8	Y
LA9	Y
LA10	Y
LA11	Y
LA12	Y
LA13	N
LA14	Y
LA15	Y
LA16	N

Step 3: Calculate the final score as follows:

$$\text{Score} = \frac{\text{number of indicators reported}}{\text{the total number of social indicators}} * 100$$

In this case, DuPont has 35 indicators reported out of 48 indicators. Therefore, the score for DuPont on completeness is 35/48=72.92%.

2. Balance

Step 1: Use the index as a reference to find the pages for each indicator.

Step 2: Check the content and judge whether it leaves a good impression or bad impression.

For LA11: “Percentage of employees receiving regular performance and career development

reviews, by gender and by employee category;” as Figure D1 shows, all employees receive regular performance reviews.

Figure D1. DuPont’s reporting of LA11

G4-LA11: Percentage of employees receiving regular performance and career development reviews, by gender and by employee category.

At DuPont, our Performance Partnership is the process for managing, coaching, developing, assessing and rewarding employee performance. It consists of ongoing formal and informal coaching. All exempt employees (100%) and some non-exempt employees globally participate in the Performance Partnership

LA11 is an ambiguous indicator because it is hard to define a numerical balance between good and bad performance review percentages. Thus, the tactic is to collect all numbers reported by companies in the sample and compute their median. Table D3 summarizes numbers reported by all companies in their reports. More than 50% of the companies claim that all of employees receive career development and regular performance reviews. In this case, 100% is the boundary between good and bad impressions, and DuPont leaves a good impression with all employees covered in performance review.

Table D3. Data of LA 11 released in all reports

Number	LA11
1	all
2	90%
3	100%
4	100%
5	all
6	100%
7	all
8	100%
9	624000 employees;100%
10	all
11	all
12	86%
13	all
14	all
15	all
16	all
17	all
18	all
19	42.26%
20	all
21	100%
22	100%

For LA1, “Total number and rates of new employee hires and employee turnover by age group, gender and region,” the ratio between male new employees and female new employees is 2:1 (see Figure D2), far above the standard of 1.05:1. Therefore, LA1 leaves a bad impression.

Figure D2. DuPont’s reporting of LA1 (1)

G4-LA1: Total number and rates of new employee hires and employee turnover by age group, gender and region.

In 2015, DuPont hired approximately 3,500 employees and experienced a global turnover rate of 9.8%. For purposes of this report, turnover is defined as voluntary and involuntary attrition.

Table 14: 2015 New Hires by Gender and Age

Region	Number New Hires
Male	67%
Female	33%

The final rating for DuPont’s balance is presented in Table D4.

Table D4. DuPont’s result in Balance

Character	MNY1	
Company Name	DuPont	
Balance		
LA1	B	
LA2	G	
LA3	N	
LA4	G	
LA5	G	all
LA6	G	
LA7	N	
LA8	G	
LA9	G	
LA10	G	
LA11	G	all
LA12	B	
LA13	N	
LA14	G	all
LA15	G	
LA16	N	

$$\text{Score} = \frac{\text{the number of bad impression indicators}}{\text{the total number of indicators reported}} * 100$$

In DuPont's report, 3 indicators leave a bad impression while 32 indicators leave a good impression. So the result is $3/(3+32) = 8.57\%$.

LA3, LA5, LA11, LA14, HR7, HR10 and SO9 are ambiguous indicators that judge balance relative to the median. Method two to measure balance (B2) removes all ambiguous indicators.

With B2, the final score for DuPont is $3/(3+27) = 10\%$.

3. Comparability

Step 1: Use the index as a reference to find the report pages for each indicator, and check how many years' data is released.

Score range:

3-three or more years in succession or qualitative question initially

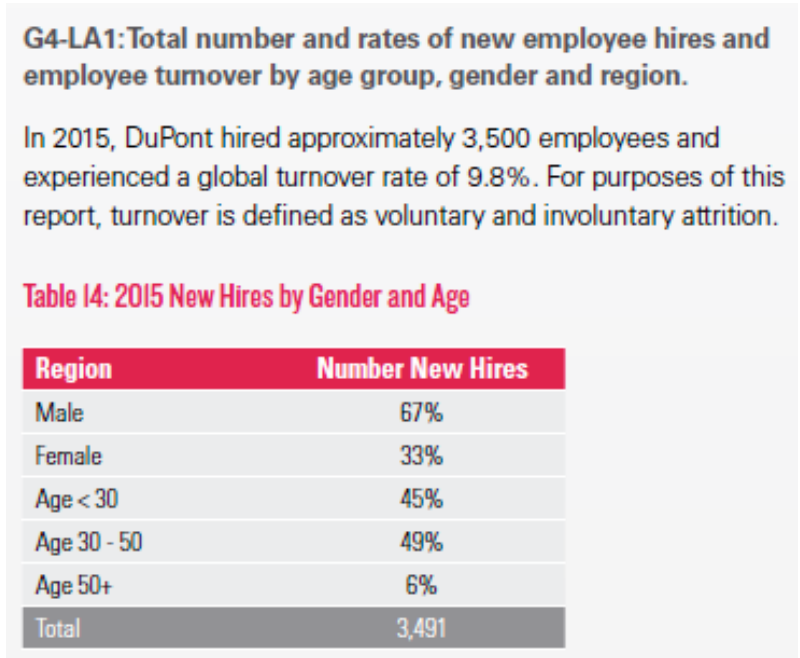
2-two years in succession

1-only this year's data

0-no data

For LA1, "Total number of rates of new employee hires and employee turnover by age group, gender and region", as Figure D3 shows, only data in 2015 is released. Thus, the score for LA1 is 1.

Figure D3. DuPont’s reporting of LA1 (2)



For LA 6, “Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities by region and by gender,” Figure D4 reveals that data for 2014 and 2015 are released, providing support to assign LA 6 a score of 2.

Figure D4. DuPont's reporting of LA6

Table 15: Occupational Health and Safety Data

	2014	2015
DuPont: Total Recordable Injuries and Illnesses Rate (per 200,000 hours worked)	.511	.457
DuPont: Lost Workday Case Rate (per 200,000 hours worked)	.083	.060
DuPont: Fatalities	4	2
Contractor: Total Recordable Injuries and Illnesses Rate (per 200,000 hours worked)	.580	.383
Contractor: Lost Workday Case Rate (per 200,000 hours worked)	.061	.036
Contractor: Fatalities	0	0

The indicator for LA2, “Benefits provided to full-time employees that are not provide to temporary or part-time employees, by major operations,” is qualitative (see Figure D5). Therefore, score 3 is assigned automatically.

Figure D5. DuPont's reporting of LA2

G4-LA2: Benefits provided to full-time employees that are not provided to temporary or part-time employees, by major operations.

The benefits offered in each country are dependent on local market practices, which in turn are influenced by elements including state benefit offerings, income and social programs. Even though the offering in each country is different, the benefits package typically includes the following for full-time and part-time employees:

- **Income protection (disability protection):** Contributions to individual income protection insurance, or participation in company insurance plan.
- **Medical:** Contribution to individual medical insurance, or participation in company medical insurance plan.
- **Accident:** Contribution to individual accident insurance, or participation in company insurance plan.
- **Retirement:** Retirement savings plan contributions or participation in a company defined benefit pension plan.
- **Global work: life and wellness support programs:**
 - Employee Assistance Program:** The Company provides up to (6) free counseling sessions per year to all employees.
 - Emergency Travel Health Care Assistance:** The Company provides a free resource to assist employees in finding quality emergency care and emergency medical transportation while traveling on business.

Table D5 shows DuPont's comparability scores on selected indicators.

Step 2: Calculate the final score as the sum of all indicators' scores, i.e.

$$\text{score}=1+3+0+3+1+2+0+3+1+3+1+1+0+1+3+0\dots+1=65.$$

Table D5. DuPont’s score in Comparability

Character	MNY1	
Company Name	DuPont	
Comparability		
LA1	2015	1
LA2	Qualitative	3
LA3	N	0
LA4	Qualitative	3
LA5	2015	1
LA6	2014-2015	2
LA7	N	0
LA8	Qualitative	3
LA9	2015	1
LA10	Qualitative	3
LA11	2015	1
LA12	2015	1
LA13	N	0
LA14	2015	1
LA15	Qualitative	3
LA16	N	0

4. Clarity

Step 1: Use the index as a reference to find the report pages for each indicator.

Step 2: Judge whether the content reported complies with what the GRI indicator asks for. If yes,

a score of 1 will be given; if no, the score is 0.

Table D6. DuPont's score in Clarity

Character	MNY1
Company Name	DuPont
Clarity	
LA1	1
LA2	1
LA3	N
LA4	1
LA5	1
LA6	1
LA7	N
LA8	1
LA9	1
LA10	1
LA11	1
LA12	1
LA13	N
LA14	1
LA15	1
LA16	N

Step 3: calculate the final score.

$$Score = \frac{\text{sum up of all indicators' score}}{\text{the total number of indicator reported}} * 100$$

DuPont reports 35 indicators out of 48 in the social dimension; 32 of them have score 1 while the rest have score 0. Thus, the final score is $32/35=91.43\%$.