Lawrence Technological University

College of Management

A Mixed Methods Analysis of Professionals' Perceptions of the Impact of Sustainable Supply Chain Management on Company Performance

Presented in partial fulfillment of the requirements

for the degree of

Doctor of Business Administration

Jean-Paul Meutcheho

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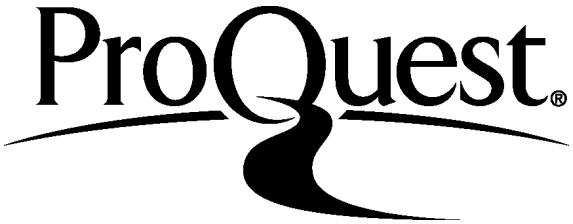

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Approved by the Dissertation Committee Friday 11/4/2016 (date)

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LAWRENCE TECHNOLOGICAL UNIVERSITY

A MIXED METHODS ANALYSIS OF PROFESSIONALS' PERCEPTIONS OF THE IMPACT OF SUSTAINABLE SUPPLY CHAIN MANAGEMENT ON COMPANY PERFORMANCE

by

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Abstract

Waves of sustainability initiatives are affecting many traditional corporate functions. While some companies focus on their own internal sustainability initiatives, there are a small but growing number of initiatives focused on promoting sustainability across the supply chain. The resulting sustainable supply chain management (SSCM) is faced with the challenge of justifying its contribution to the performance of the focal company. This research attempts to understand the relationship between SSCM and focal company performance. It also investigates the moderating role of company size, industry collaboration and the regulatory framework on the SSCM-performance relationship.

This study used a mixed methods approach. Quantitative and qualitative data were collected from 242 professionals through an online survey. Simple regression, hierarchical regressions, and factorial plotting in Minitab 17 were used to analyze the quantitative data. Qualitative data were analyzed using thematic analysis. Triangulation was used to integrate the quantitative and qualitative analyses.

The results of the study strongly suggest that SSCM has a positive impact on the focal company's environmental, social, and economic performance. The results also indicate that company size, industry collaboration, and especially the regulatory framework moderate the impacts of SSCM on the focal company's performance. The qualitative analysis explored in greater depth the benefits (risk mitigation, competitive edge, and improved reputation), challenges (cost, difficulty of enforcement, and lack of commitment) and solutions to the challenges (leadership, regulations, and collaboration) of SSCM. The triangulation of the quantitative and qualitative analyses validated

SSCM's contribution to performance, and the moderating effects of company size, industry collaboration and the regulatory framework.

The study concludes with recommendations for both companies and policy-makers. The positive effects of SSCM on performance support focal companies using SSCM, and providing suppliers with additional market incentives to adopt SSCM. OEMs and policy-makers should work together to devise fact-based regulations that support both societal and company objectives.

Dedication

This dissertation is dedicated to my parents, Jules Kouam, Francois Djilo, Marceline Guiadem, and Jeanne Magne. Your unreasonable belief in education immensely contributed to sparking the light that lit the path of this journey. I will be forever grateful for your sacrifices, love, and sense of purpose.

I also dedicate this work to my wife Francine whose unwavering patience and understanding throughout this journey paved the way for a harmonious family life and kept our children's mind away from missing my attention. Your effective support is greatly appreciated. To my children Chloe, Nathan, Axelle, and Christian, I say thank you for your "distractions" that reminded me of my parental duties even when I thought I was founded in doing something else. I hope your witnessing of this experience has left an indelible mark on you and will help you in valuing the importance of education, perseverance, and drive to accomplish.

Finally, I would like to dedicate this dissertation to you that anonymous person who lent a listening ear when I needed to talk, who encouraged and advised when you saw me faltering, who took a survey from a stranger, or silently endured the discomfort caused by my lack of attention. To you I say thank you for your random acts of kindness.

Acknowledgements

I would like to thank my dissertation committee members who were very generous with their time and expertise. A special thank you to Dr. Thomas Marx my committee chair for the many hours spent reading, reflecting, advising, and guiding my work. Your patience and sense of purpose made this project come through. To Dr. Jacqueline Stavros, your unmatched balance of scholarly insights and genuine human decency gave me the right perspective and made your advice all the more effective. To John Viera, thank you for your corporate insights and professional depth, your practitioner approach and guidance kept this research work rooted in corporate reality.

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Chapter 1 Introduction

Corporations around the world are facing increasing pressure to address the environmental and social consequences of their business decisions. Pressures to adopt sound sustainability principles and practices have come from external stakeholders such as non-governmental organizations (NGOs), academia, and governments (Ageron, Gunasekaran, & Spalanzani, 2012; Marrewijk & Were, 2003; Steger, Ionescu-Somers, & Salzmann, 2007; United Nations Global Compact [UNGC], 2010), from competitive forces within the industry (Svensson, 2009), or from the views and values of leaders within the companies themselves (Larkin, 2006; Laszlo, 2008). Addressing the environmental and social consequences of their actions raises risks and costs for the company. However, some maintain that addressing these challenges presents strategic opportunities for the firm as well (Rao & Holt, 2005). Effectively balancing the costs and benefits of addressing environmental and social concerns could be a source of long-term competitive advantage for organizations (Shi, Koh, Baldwin, & Cucchiella, 2012).

The complexity of tackling environmental and social issues has been magnified by firms' increasing reliance on global supply chain networks to produce quality products at lower cost (Christopher, Mena, Khan, & Yurt, 2011; Lai, Harjati, McGinnis, Zhou, & Guldberg, 2008; Zhu, Sarkis, & Lai, 2008). Different members of the integrated supply chain may have divergent views of the need to address environmental and social issues, different strategies for addressing these issues, and different capabilities for doing so compared with the focal company in the supply chain. A focal company is the supply chain participant that manages the supply chain, often it is original equipment manufacturers (OEMs) (Seuring, 2008). In this study, the focal company is the company

whose supply chain is being studied (Catalan & Kotzab, 2003; Pfeffer & Salancik, 1978; Wolf, 2014). Effectively addressing environmental and social issues typically requires a focal company to develop a comprehensive supply chain management (SCM) strategy that aligns, coordinates, and integrates the actions of suppliers throughout the chain (Carter & Rogers, 2008; Morali & Searcy, 2013).

A few corporations such as Ford Motor Company, Hewlett-Packard (HP), and Wal-Mart are reported to have developed and implemented SCM strategies that optimize the environmental, social, and economic dimensions of producing goods or services throughout the supply chain (Laszlo & Zhexembayeva, 2011, Wong, 2013). For instance, Wal-Mart, the largest corporation in the world measured by sales revenues ($476 billion US in Fiscal Year 2014), manages an extensive global supply chain network that has turned the integrated management of environmental, social, and economic issues, sustainable supply chain management or SSCM, into a source of competitive advantage (Laszlo & Zhexembayeva, 2011).

Ford Motor Company has made SSCM an integral part of its corporate sustainability, which seeks to make mobility affordable environmentally, socially, and economically. Ford's sustainability goals for its supply chain include promotion of human rights, respect for the environment, promotion of diversity and decent working conditions throughout the supply chain, and addressing human rights and environmental issues related to certain raw materials (Ford Sustainability Report, 2013). Very similar to Ford in the way it accounts for the Triple Bottom Line (TBL), HP's approach to sustainability and sustainable supply chain management (SSCM) with partners throughout the supply chain endeavors to "move our business forward while helping

people prosper and companies thrive by reducing the environmental footprint across our value chain" (Hewlett-Packard, 2013 p. 76).

With declining natural resources and growing demands, threats of climate change, and concerns about air and water pollution, toxic wastes, fair treatment of socially disadvantaged groups, adverse community impact, and growing requests for more corporate transparency, the need to integrate sustainability into SCM should be widely accepted (Laszlo & Zhexembayeva, 2011). However, the scarcity of empirical evidence of SSCM's contribution to corporate profitability has generated reticence from OEMs, suppliers and other stakeholders. The result is that, with a few exceptions, the business world has not enthusiastically embraced SSCM.

Background to the Study

Gibson's (2001) call to integrate the environmental, social, and economic dimensions of business, or the TBL, is increasingly being urged on corporations despite the lack of clear consensus or compelling empirical evidence that SSCM contributes to long-term competitive advantage. The underlying philosophical perspective of the TBL was developed by Brundtland and the World Commission on Environment and Development (WCED, 1987). They advocated satisfying today's needs without compromising the needs of future generations. The term TBL itself was pioneered by Elkington (1997, 1998). TBL suggests that corporations should minimize the harm resulting from their activities and foster holistic growth by optimizing their environmental, social, and economic goals. Corporations should avoid a narrow focus on profit to the detriment of environmental and social concerns (Carter & Rogers, 2008; Robins, 2006; Norman & MacDonald, 2004). Subsequently authors like Shi et al. (2012)

argue that SSCM practices built on the three legs of TBL will eventually lead to favorable financial performance. Shi et al.'s argument is supported by a number of theories suggesting that substantial benefits can be derived from a TBL approach to SCM. Incorporating sustainable business practices into SCM based on the TBL is the essence of SSCM (Morali & Searcy, 2013). As developed in Chapter 2 theories for integrating sustainability into SCM have been advanced:

The new development paradigm (NDP). NDP focuses on the environmental, social, and economic impact of multinational firms (Dunning & Fortanier, 2007).

The base of the pyramid (BOP). BOP is focused on the problem of social exclusion. BOP scholars argue for an alternate business model that includes impoverished communities in the modern economic systems (Hall & Matos, 2010 and Prahalad & Hart, 2002).

The sustainability framework (SF). SF is based on the following distinct but complementary theories of SCM:

The resource dependence theory (RDT). RDT finds its origin in the work of Pfeffer and Salancik (1978). They argue that organizations are dependent on other stakeholders for their survival. The resulting multiple dependencies will create relationships between the focal company (firm) and its stakeholders. Suppliers represent a set of such stakeholders with whom the focal company has mutual dependencies that are developed to reduce risks.

The transaction cost economics (TCE). TCE theory finds its root in the work of Williamson (1975, 1985, and 1991) and has been the dominant theory for analyzing transactions risks and associated contractual solutions (Leiblein, 2003). At a high level,

TCE examines the comparative advantages of alternative types of contracts (market or hierarchical contracts) for governing buyer-supplier transactions (Williamson, 2002).

The resource-based view (RBV) of the firm. Unlike the TCE, which is focused on contracts and transactions, the RBV is geared toward creating or enhancing the competitive advantage of the organization (Priem & Swink, 2012).In his work on purchasing potential contribution to competitive advantage, Ramsay (2001) points out that RBV or the Resource Based Perspective (RBP) as he calls it, is perhaps the most widely accepted view of corporate strategy.

The resource advantage theory (RAT). RAT seeks to provide a theoretical foundation to the claim that competitiveness can be enhanced in some circumstances by social structures and trust-based governance (Hunt & Arnett, 2003).

These theories are rooted in the social sciences (primarily sociology, political science, and economics.), strategic management, and the theory of competitive advantage (Carter & Rogers, 2008). SF, for example, borrows from all these theories to devise a context in which contractual obligations, access to resources, and transactions among the focal company and its suppliers are optimized by the TBL.

Problem Statement

The literature review indicates that there are at least two opposed camps in the debate about SSCM's contribution to corporate performance. Some researchers suggest that the environmental and social legs of the TBL should be integrated into business policies and practices (Brown, 2006; Elkington, 1997, 1998; Gibson, 2001). Other researchers argue that integrating environmental and social considerations into business

or SCM should be considered only if there is evidence that this supports the economic goals of the company (Friedman, 1970; Norman & Macdonald, 2004; Robins, 2006).

While there is limited empirical support for the positive impact of SSCM on corporate performance, there is a compelling theoretical foundation for arguing that a TBL approach to SCM can optimize the interaction of environmental, social, and economic factors to meet the needs of all stakeholders. Many researchers, however, focus primarily on the environmental and social legs of TBL underlying SSCM. The economic leg, critical to focal companies and their suppliers, is overlooked or simply assumed, even though it is essential to the business case for SSCM. The question is: can SSCM be a viable concept without compelling theoretical and empirical support for all three legs of the TBL stool?

Purpose of the Study

The purpose of this study is to examine the impact of SSCM, the integration of TBL into SCM, on the environmental, social, and economic performance of the focal company responsible for managing the supply chain. Positive impacts along all three dimensions would better equip SCM professionals with a business rationale for adopting a sustainability approach to SCM based on the TBL. Although performance is a key concern to all participants in the chain, this study will limit its analysis of performance (environmental, social, and economic) to the focal company considered to be the chief architect of SSCM for the supply chain. The study also assesses the moderating effects of company size, industry collaboration structure, and regulatory framework on SSCM's impact on the focal company's performance.

The key research questions for this study are:

- Does SSCM impact the focal company's environmental performance?
- Does SSCM impact the focal company's social performance?
- Does SSCM impact the focal company's economic performance?
- Do industry collaboration, company size, and regulatory framework moderate SSCM's impact on the focal company's performance?

Research Variables

As indicated in Figure 1.1, the environmental and social dimensions of SSCM are thought to impact the focal company's environmental, social, and economic performance. The impact of SSCM on company performance is assumed to be moderated by company size, industry structure, and the regulatory framework. The size of a focal company and the volume of its business with suppliers could affect its influence on suppliers' adoption of sustainability requirements (Tate, Ellram, & Kirchoff, 2010). The level of collaboration among companies on SSCM issues is believed to impact the effect of SSCM on the performance of the focal company (Golicic & Smith, 2013).The regulatory framework can facilitate or inhibit the focal company's sustainability agenda; suppliers are more inclined to comply with the focal company's requirements if they are derived from legal mandates (Liu, Yang, Qu, Wang, Shishime & Bao, 2012).

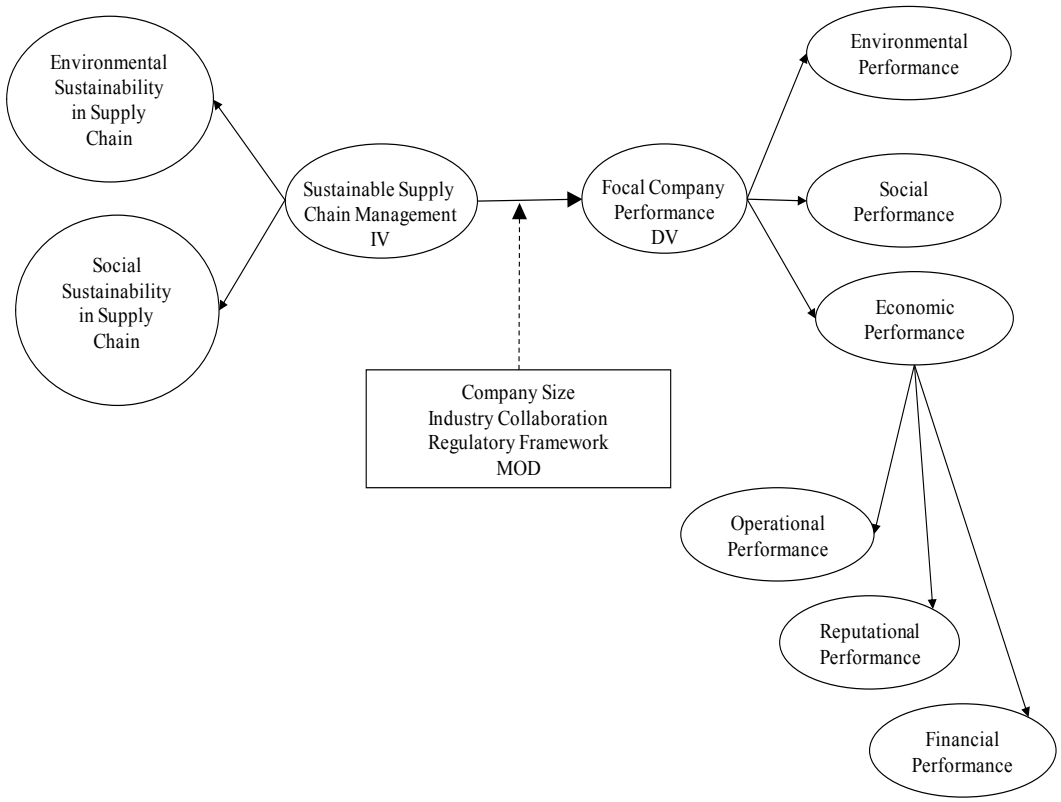

Figure 1.1 Conceptual Model for Analyzing SSCM's Contribution to Environmental, Social, and Economic Performance.

The definitions of the key variables in Figure 1.1 follow:

Environmental sustainability. The environmental element of SSCM is concerned with preserving natural capital (Wong, 2013). It relates to all SSCM policies, decisions, and practices aimed at minimizing the negative impact of actions taken within the supply chain on the natural environment (Wang & Sarkis, 2013). This impact includes effects on deforestation, air quality, water quality, climate change, and resource depletion. The environmental element of SSCM is measured through compliance with standards like ISO 14001, inclusion of environmental criteria in suppliers' scorecards, and the consideration given to environmental issues in sourcing decision.

Social sustainability. The social dimension of SSCM includes issues that are anthropomorphic (Wang & Sarkis, 2013). These issues impact quality of life such as working conditions, justice, and fairness for all stakeholders, and economic impact on local communities and living standards. They are measured through compliance with regulations and certifications, financial contributions to philanthropic causes, employees' involvement in local communities, recruiting, fair wages, and retention of persons from socially underrepresented and indigenous groups.

Environmental performance. Environmental performance refers to the focal company own environmental performance. It is often measured by internal metrics or third party (i.e., external sustainability rating entities, media or NGOs) evaluation and ranking. In this study environmental performance is measured by the perceptions of survey respondents.

Social performance. Social performance refers to the focal company own social performance. It is often measured by internal metrics or third party (i.e., external sustainability rating entities, media or NGOs) evaluation and ranking. In this study, social performance is measured by the perceptions of survey respondents.

Economic performance. Economic performance refers to the third leg of the TBL stool. It is measured by operational, reputational, and financial performance. In this study, economic performance is measured by the perception of survey respondents.

Operational. Operational performance is a direct predictor of financial performance. Operational performance leads to cost efficiency, higher quality products with better residual value (Zhu et al., 2012).

Financial. Financial performance is measured by sales, market share, and profit (return on assets and sales). They are the direct measures of profitability in the TBL (Wang & Sarkis, 2013).

Reputational. Reputational performance is measured through customer satisfaction, street credit as a "good corporate citizen," and a track record of regulatory compliance (Wolf, 2014). These measures enhance customer retention, raise market barriers, and create superior brand image.

Company size. Company size is measured by annual sales, number of employees, and the company's global footprint presence in how many countries around the world.

Industry collaboration structure. Industry collaboration structure is measured by the level of collaboration on SSCM issues among companies in the supply chain, often at the industry association level, to address SSCM issues through common training, audit and certification programs.

Regulatory framework. The regulatory framework refers to the level and stringency of government mandated requirements and standards that affect the company's environmental and social decisions and actions in the supply chain. These mandates could emanate from agencies like the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Security and Exchange Commission (SEC), and the National Highway Traffic Safety Administration (NHTSA) in the USA.

Research Hypotheses

The following hypotheses will be tested to determine the effect of SSCM on performance and the presence of any moderating effect

- H1: SSCM (environmental sustainability and social sustainability in the supply chain) impacts company's performance.
    - H1a: SSCM impacts company's environmental performance.
    - H1b: SSCM impacts company's social performance.
    - H1c: SSCM impacts company's economic performance.
- H2: Company size, industry collaboration, and the regulatory framework moderate the impact of SSCM on company's performance.
    - H2a: Company size moderates the impact of SSCM on company's performance.
    - H2b: Industry collaboration moderates the impact of SSCM on company's performance.

      H2c: Regulatory framework moderates the impact of SSCM on company's performance.

Significance of the Study

This study aims to assess the impact of SSCM on the environmental, social, and economic performances of the focal company in the supply chain. It will extend the knowledge of why firms engage in SSCM. It will also test the relevance of the TBL to SCM. If the study finds that SSCM enhances firm's economic performance (Shi et al, 2012; Wang & Sarkis, 2013; and Wolf, 2014), this will help justify SSCM on practical business ground beyond the usual societal benefits associated with SSCM (Friedman, 1970). Establishing that SSCM contributes to firm performance will further equip professionals to make the case for accounting for sustainability in supply chain management, and also provide validation for the work of those companies that have taken

the lead in adopting a TBL approach to managing their business. For instance, the leadership role of companies like Intel in the implementation of section 1502 of the U.S. Dodd Frank Act on conflict minerals shows that acknowledging and valuing SSCM's contribution to firm performance will have a catalyst and multiplier effect on the adoption and propagation of SSCM practices.

At a societal level understanding how, and under what conditions SSCM contributes to all three aspects of corporate performance is essential to future public policies. The promotion of corporate sustainability seems to be a viable way to conserve natural capital (Wong, 2013), preserve, and enhance human welfare in a context of increasing global population and limited resources (Brown, 2006).

Overview of the Research Methodology

This study used a mixed methods research methodology. Mixed methods research involves collecting, analyzing, and mixing qualitative and quantitative data (Creswell & Clark, 2006). The rationale for using the mixed methods approach is based on its robustness and ability to "attack a research problem with an arsenal of methods that have non-overlapping weaknesses in addition to their complementary strengths" (Brewer & Hunter, 2006 p. 4). Quantitative and qualitative data were collected from 242 professionals. The survey consisted of direct questions, likert-scale questions, and open-ended questions. It was administered electronically through Survey Monkey.

Quantitative and qualitative data sets from both methods were integrated to form a more complete picture of the impact of SSCM on firm's performance. The mixed methods approach was selected because "a combination of both forms of data can provide the most complete analysis of problems" (Creswell & Clark, 2006 p.13).

For the quantitative analysis, multiple regressions in Minitab 17 were used to determine the impact of SSCM on the firm's environmental, social, and economic performance. Hierarchical multiple regression was used to assess the effects of the moderating variables (company size, industry collaboration, and regulatory framework) on the impact of SSCM-performance relationship (Dizikes, 2010; Lewis, 2007). Hierarchical regression first tested the relationships among the independent and dependent variables before looking into the added effect of the moderating factors. This ensured that the effect of any moderating factors was secondary to the effect of the independent variables (Ciptono, Ibrahim, & Sulaiman, 2010; Shanock, Baran, Gentry, Pattison, & Heggestad, 2010).

Survey respondents were also asked to answer two open-ended questions about the benefits, challenges and solutions to environmental and social sustainability. After reviewing and organizing the content of the responses, the resulting data were analyzed using thematic analysis. Thematic analysis, also called interpretive content analysis, is an exploratory approach to qualitative data analysis that enables the researcher to translate qualitative data, based on emerging themes, into quantitative data through content analysis (Boyatzis, 1998; Schwandt, 2007).

Finally a meta-inference or triangulation of quantitative and qualitative data was conducted. Meta-inference is a relatively new term that refers to triangulation and is defined by Venkatech, Brown, and Bala (2013) "as theoretical statements, narratives, or a story inferred from an integration of findings from quantitative and qualitative strands of mixed methods research" (p.18). Meta-inference seeks to integrate quantitative and

qualitative analyses into one single analysis to offer a holistic and deeper analysis of the phenomenon of interest.

Limitations of the Research

The first limitation of this study is its geographic scope. Geographically, the study was limited to companies based in, or having operations, in the North American Free Trade Area (NAFTA), namely Canada, Mexico, and the U. S. with a prime focus on companies belonging to the automotive, electronics, telecommunications, and aerospace industries. Analysis of environmental, social, and economic performances in this study is limited to the focal companies'. The performance of other supply chain participants is out of the scope of this research.

The second limitation is the type of data. As Wang and Sarkis (2013) noted, using a survey instrument to examine perceptions of organizational performance rather than publicly available and objective organizational performance data has its limitations. However, publicly available data on company performance are not readily available for smaller, privately-held companies, and are rarely available in the detail necessary for the study being undertaken. Moreover House, Dorfman, Javidan, Hanges, and de Luque (2014) remarked that "Perceptual measures have been used extensively to assess firm performance due to the lack of reliable and objective financial performance data" (p.152).

The third limitation is social desirability. Managers are inclined to attribute to themselves statements that are desirable and reject those deemed undesirable (Crowne & Marlowe, 1960). In sum despite all the benefits that a mixed methods approach brings to a research project, one must always maintain a healthy skepticism given the provisional and contingent nature of scientific knowledge (Brewer & Hunter, 2006).

Definitions of Key Terms

Considering the diverse understanding given to both SCM and sustainability some clarifications of the definitions used in this study are important to make. Therefore the following section reviews the definition of prevailing terms used throughout this study.

Sustainability and TBL. The application of sustainability to business practices is a relatively new and evolving concept (Holt & Ghobadian, 2009; Pope, Annandale & Morrison-Saunders, 2004). The Brundtland Report defined sustainable development as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" p.41 (UNGC, 2010; World Commission on Environment and Development [WCED], 1987). This definition puts sustainability at the crossroads of development and the environment.

Having noted that material gains alone are not sufficient measures or preservers of well-being, and following Elkington (1997) call to adopt a triple bottom line approach (TBL) that optimizes economic prosperity, environmental quality, and social justice, Gibson (2001) separates development issues into economic and social factors, thus reinforcing the TBL as a base concept for sustainability. Sustainability stands on three pillars: the environmental, the social, and the economic. The TBL approach carries the inherent risk of promoting conflicts and trade-offs among the three factors. Mindful of the negative impact of these trade-offs Gibson (2001), later echoed by Mollenkopf, Stolze, Tate, and Ueltschy (2010) opts for a principles-based approach to sustainability. This approach emphasizes and promotes interconnectedness and interdependencies among the three pillars. This study adopts the TBL-based approach to sustainability as it

seeks to understand its effect on firm's performance, TBL will be viewed in this study as an approach to sustainability.

Supply chain management (SCM). Broadly presented, SCM is the integration of key business processes from end-user through original suppliers that add value for customers and -other stakeholders (Alvarez, Pilbeam & Wilding, 2010; Lambert & Cooper, 2000). Describing the how-to-integrate, and assigning a goal to the integration of these processes, Seuring and Muller (2008), posit that this integration should be achieved through improved relationships to create a durable competitive edge. This strategic-marketing based approach to SCM can easily overshadow its logistics' origins. In fact, SCM had been viewed as managing logistics outside the firm to include suppliers and customers (Colicchia, Melacini, & Perotti, 2011; Dey, LaGuardia, & Srinivasan, 2011; and Fisher, 1997). This approach and others do not account for the procurement or purchasing aspect of SCM. But as Kraljic (1983) puts it, whenever a manufacturer must provide a volume of critical items competitively under complex conditions, purchasing or better yet, supply management is relevant. This research looked at SCM from the standpoint of its upper stream, which includes the focal company and its suppliers (Hall & Matos, 2010; Lambert et al, 2000). It is not in the scope of this paper to review downstream supply chain operations (i.e., focal company and its customers).

Sustainable supply chain management (SSCM). Bridging or better yet integrating (SCM) and sustainability is important as policies and practices need to extend beyond organizations' boundaries and integrate the whole supply base (Meehan & Bryde, 2011). This has led to the emergence of a new construct called sustainable supply chain management (SSCM). SSCM is becoming a dominant topic in SCM (Pagell, Wu, &

Wasserman, 2010). In fact, some argue that to be truly sustainable, a supply chain would at worst do no net harm to natural or social systems while still producing a profit over an extended period of time. Thus defined, a truly sustainable supply chain could, customers willing, continue to do business forever (Pagell & Wu 2009). In this study, SSCM is based on the TBL which is an important approach to sustainability.

Corporate social responsibility. This term appears recurrently in business ethics related publications. Most articles published on the topic of SSCM in the *Journal of Business Ethics*, were using the term CSR and linking it to the role of business in the economy far beyond the production of goods and services and the maximization of shareholders' wealth. Businesses were expected to show responsibility for the physical environment and society (Anderson & Skjoett-Larsen, 2009; Laudal, 2010) and CSR was viewed as voluntary and altruistic rather than mandated or profit seeking. Amaeshi, Osuji, and Nnodim (2008) saw CSR as a commitment of the corporation to operate in an economic and environmentally sustainable manner while recognizing stakeholders' interests. CSR expects leading companies to wield positive moral influence along the supply chain (Amaeshi & Amao, 2009). Thus, an integral part of CSR is that the focal company assumes the responsibility for the environmental and social effects caused by its suppliers' operations (Mueller, Dos Santos, & Seuring, 2009). CSR requires among other things, training of key personnel at the suppliers' level, positive incentives for the suppliers in the form of additional business (Anderson et al., 2009).

The application of CSR to SCM in general and purchasing in particular has yielded the coining of new expressions like Purchasing Social Responsibility (PSR); Salam, 2009. PSR relates to CSR activities in the framework of purchasing. CSR carries

an inherent insinuation that it deals only with social issues. This is probably the reason behind the growing use of the expression Corporate Responsibility (CR) or Corporate Sustainability (CS) in reference to CSR to broaden the scope of the concept (Marrewijk et al., 2003; Strand, 2009). To summarize this section on CSR, the idea that CSR is a very dynamic and morphing phenomenon (Mamic, 2005) is evidenced by the many terms used to describe it.

Sustainable development (SD) or durable development (DD). These phrases are often evoked in reference to sustainability. Their origin can be traced to the fields of ecology and social sciences. SD and DD gained more prominence with the Brundtland Report, which defined sustainable development as a development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p.41). As indicated earlier, this study defaults to the term sustainability except when trying to make a point of distinction.

Organization of the Dissertation

This study is organized into five chapters. Chapter One introduces the topic, provides background for the importance of the study, and presents the conceptual model for testing the impact of SSCM on firm performance. The first chapter also includes the study's purpose, research questions, hypotheses, significance, limitations, and organization of the study.

Chapter Two reviews the literature on SSCM theories, basic constructs, and controversies. The literature review is structured around the following major themes: (1) Sustainability and the Triple Bottom Line, (2) Supply Chain Management (SCM), (3) SCM and Theory Building, (4) Sustainable Supply Chain Management (SSCM), (5)

SSCM and Performance, and (6) Theories for the implementation of Sustainable Supply Chain Management (SSCM). Chapter Two concludes with a summary of the literature and assessment of the gaps, agreements, and controversies in the literature.

Chapter Three describes the research design and methodology used to collect, organize, and analyze the data to answer the research questions and test the hypotheses. It also describes the sample, survey instrument, and unit of analysis, the procedures for data collection, storage, retrieval, and analysis.

Chapter Four presents the demographic characteristics of the sample and the tests of reliability, validity, and intercorrelations of the data. Next descriptive and inferential statistics, including tests of hypotheses, are reviewed, followed by a presentation of the qualitative data analysis. This chapter concludes with a triangulation of the results from the qualitative and quantitative analyses.

Chapter Five interprets and discusses the results for each research question and hypothesis in relation to the literature. It presents insights from the study for both practitioners and scholars. This final chapter closes with a review of the limitations of the study and suggestions for future research.

Chapter 2 Literature Review

Introduction

This chapter provides a review of relevant literature on SSCM, understood as the integration of SCM and sustainability through the incorporation of the TBL into SCM, and its contribution to focal company (firm) performance. This study examines the impact of SSCM on the environmental, social, and economic performance of the focal company responsible for managing the supply chain. If the study finds a positive correlation between SSCM and performance then, professionals and their companies will have a business rationale for adopting a TBL approach to SCM. The key research questions for this study are:

- Does SSCM impact the focal company's performance?
    - Does SSCM impact the focal company's environmental performance?
    - Does SSCM impact the focal company's social performance?
    - Does SSCM impact the focal company's economic performance?
- Do company size, industry collaboration, and the regulatory framework moderate SSCM's impact on performance?

The review will help inform the assessment of the following hypotheses:

- H1: SSCM impacts the company's performance.
    - H1a: SSCM impacts environmental performance
    - H1b: SSCM impact social performance
    - H1c: SSCM impacts economic performance
- H2: Company size, industry collaboration, and the regulatory framework moderate the impact of SSCM on company's performance.

To better discern the contribution of SSCM to company's performance, the review will be conducted from the perspective of the constructs of sustainability and SCM presented as the founding pillars of SSCM (see Figure 2.1).

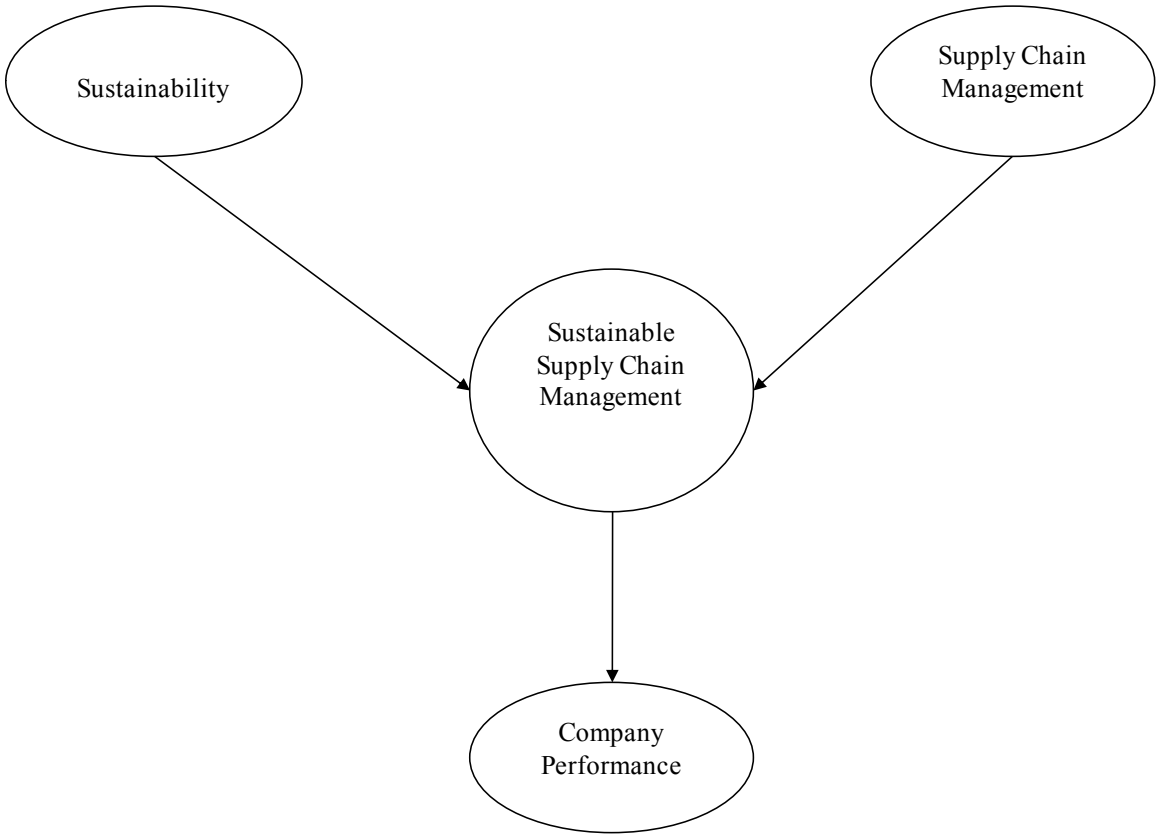

Figure 2.1 Schema of Literature Review for SSCM and Corporate Performance.

The first section of this chapter reviews the theoretical frameworks that have guided SCM. The second section of the chapter looks into justifications for a sustainability approach to business and SCM, and also evokes some of the theoretical lenses of the construct. The third section of the chapter explores the extant theoretical lenses that have helped integrate SCM and TBL, explores SSCM's contributions to company performance, and the effects of the moderating variables (company size, industry collaboration, and regulatory framework) on the relationship between SSCM and

firm performance. The chapter concludes with a summary of key insights from the literature, controversies, gaps, and the implications of the literature for this study.

The literature review consisted of dissertations, peer reviewed journals articles, white papers and books published between the 1950s and 2014. Publications from corporations, governments, and other supra-national organizations were also included in the literature review.

Sustainability

Based on the work of Brundtland and WCED (1987), sustainability advocates for satisfying today's needs without compromising the needs of future generations. It is built on the idea that businesses ought to run their operations in a manner that optimizes environmental, social, and economic objectives; this is often referred to as the TBL. The term TBL itself was pioneered by Elkington (1997, 1998). TBL suggests that corporations should minimize the harm resulting from their activities and foster holistic growth by optimizing environmental quality, social justice, and economic prosperity. To achieve the TBL requires "a revolution of thinking in no less than seven dimensions: markets, values, transparency, life-cycle technology, partnerships, time perspective and corporate governance" (Jeurissen, 2000, p.229). The TBL concept grew out of the idea that although the issues or crisis that sustainability seeks to address was caused in part by capitalism, capitalism remains the solution to the present sustainability crisis "capitalism can be as much the solution to the present sustainability crisis, as it is the cause" (p.229): businesses have to be an integral part of any sustainability mandate.

Others argue that at the core of sustainability is a principle or value-based drive to do something good regardless of it being a mandate or a legal requirement. The value

system of the organization is what either enhances or drives its commitment to sustainability (Doorey, 2011; Marrewijk et al., 2003). This value-based view has added a fourth dimension to the commonly cited three pillars of sustainability namely environmental, social, and economic (Amaeshi et al., 2008; Carter & Easton, 2011; Laudal, 2010; Seuring, 2008; Tulder, Wijk, & Kolk, 2009). The principle pillar being the common thread that helps support, guide, and integrate the other three.

In practice, the exhortation approach to sustainability has shown its limits, especially when one considers its human rights orientation (Hartlieb & Jones, 2009). This limit is further evidenced by the growing influence of corporations who represent 40 to 51% of the world largest economic entities (Carasco & Singh, 2003; Korten, 2001; and International Monetary Fund-IMF-, 2010). Corporations have continued their domination of the world economy to the detriment of nation-states that have seen their roles diminished.

Micro-economic decisions made by individual companies in full respect of the law could have unintended macro-economic consequences. It is along this same line of thought that Brown (2006) in his analysis of the effect of competition between the food and fuel markets, argues that if the fuel value of a commodity is higher than its food value, that commodity will turn into fuel. The application of this analysis to the corn supply chain can be quite revealing: corn-based food shortage driven by the growing utilization of corn in the production of fuel. Brown (2013), shifting the analysis to the energy and automotive sectors, remarks that automotive OEMs could play a key role in addressing the growing consumption of oil and its effects on the environment. These OEMs can do so by promoting electric car that cost less to operate and are friendlier to

the environment than conventional cars that are powered by internal combustion engines. However, Brown's analysis does not appear to give due consideration to the practical issues associated with transitioning away from the internal combustion engine.

Ford Motor Company's sustainability strategy, encapsulated in the concept of mobility, is mindful of the multifaceted approach needed to effect a TBL-like transition to better fuel economy. Beyond environmental and social considerations, this approach takes into consideration business specific issues such as customers' preference, infrastructure development, and commercial viability (Ford Motor Company, 2012/2013). The company blueprint to achieve its sustainability objectives includes a panoply of options for customers in the short, medium, and long-term. These options include improving the fuel efficiency of conventional internal combustion engines, increased usage of light weight material, electric and hybrid engine technologies, and rebalancing its product portfolio to produce more fuel efficient cars.

Although he may not have been aware of the implications of his fuel supply choice on the corn-based food market or the environment, the SCM leader is not immune to the criticism resulting from such a decision. Likewise car makers could be blamed for not producing enough fuel efficient vehicles; however, the shift to the mass production of electric vehicles for example could be sub-optimal if the infrastructure network and consumers' mindset, that are clearly beyond the sphere of companies' direct influence, are not ready for the transition. But, critics will often target their recriminations at the corporations involved in the process. Cavanagh (2008) in his recommendation to business leaders facing such challenging CSR issues proposes a set of four values: rights

and duties, justice, utilitarianism, and caring that can be used as a guiding compass for sustainable business decisions.

The Rights and Duties norms put the emphasis on the positive laws and their respect, especially as they relate to individual rights to be respected by corporations. The Justice norm seeks to bring natural law to light as it speaks less to the legality than to the fairness of the action. These first two values address the social pillar of the TBL. The Utilitarianism norm focuses on how corporations can effectively maximize the satisfaction of their many constituents. This is where the economic pillar of the TBL is addressed. The Caring norm calls for going beyond what is required by the law and seek to improve the well-being of all those impacted by the corporation's decisions and activities. The environmental and social pillars of the TBL can fit under this value.

These four norms speak to the basic tenants of the TBL discussed earlier with an emphasis on the principle of ethical action which drive the endogenous drive to commit to TBL. To be more pragmatic, Cavanagh also offers a decision-making framework based not on absolutely respecting each one of the four values, but instead on optimizing them through a three-step approach made of data gathering, analysis, and judgment.

First, data gathering enables the setting of a solid baseline that will ensure a fact based analysis. Second, the analysis is the critical step in which each value is weighed against the issue at hand and its expected outcome. Extreme cases of either meeting or breaching all four criteria are easily decided by either accepting or rejecting the issue respectively. Finally, the judgment step is taken. This is where a decision has to be made. Unlike in the extreme cases aforementioned, here, only a subset of the values is met. In these intermediate scenarios, Cavanagh recommends looking into overriding

factors such as the relative importance of each of the factors and the incapacitating factor or the "double effect test." The decision model and its three elements (data gathering, analysis, and judgment) could be very effective in the multifaceted world of SCM where decision making is seldom based on a single criterion. The model ensures that decisions are founded on facts, this is critical to justify the business case for sustainability to internal stakeholders, but also to address the concerns of external stakeholders whose demands are sometimes influenced and driven by ideology and lack sufficient business perspective. Moreover combining SCM and sustainability as this study does, further exacerbate the need to have adequate tools that will enable effective decision making that takes into account the needs of all stakeholders including suppliers.

The Cavanagh model of operational CSR is emulated in the Credo of corporations like Johnson and Johnson. This credo goes above addressing the TBL and singles out specific stakeholders including supplies as entities that the focal company seeks to treat ethically.

The growing power and size of corporations has created a situation in which new major players in the field of human rights (i.e. corporations) are left out of the scope of the Human Right Declaration (UNGC, 2010). To remedy this situation, the United Nations commissioned a report called the Draft Norms in 1998. This report produced a framework marked by the following:

- State-like obligations directly on business without an adequate basis in international law, possibly impeaching the sovereignty of countries
- No clear differentiation between company obligations and state duties, which will invite strategic gaming No specific enforcement provisions

Although favored by Human Rights advocacy groups, the Draft Norm was opposed by business and critiqued by both lawyers and academics (UNGC, 2010). Under the auspices of the United Nations, a new framework called the 2008 Ruggie Report was proposed and broadly adopted. It builds on extensive collaboration with stakeholders including businesses and NGOs and is based on the following three pillars:

- The State's duty to protect
- The corporate responsibility to respect
- Access to remedies

The Ruggie Report has produced multiple spin-off documents aimed at fostering collaboration among stakeholders in the area of sustainable business practices. In the domain of supply chain, the Ruggie Report notes that suppliers are held to the same "responsibility to respect" human rights as the focal company. Therefore, both the focal company on one hand and its suppliers-partners on the other hand have to collaborate throughout the supply chain and share the responsibility of their collective impact such as not to infringe on human rights (UNGC, 2010). After the exploration of the concept of sustainability, the review will next look into the state of the literature on the second major construct: supply chain management.

Supply Chain Management (SCM)

SCM is a dynamic field that deals with a myriad of corporate functions such as logistics, purchasing, and information management. Despite its pragmatic aspects, SCM is founded on sound theories that are important for the rigor and conceptualization of the field. Without making a claim to an indigenous theory, SCM has witnessed a broad and

deep academic attention through many theories. The following sections will deal with the importance of theory building and a review of sample SCM theories.

SCM and theory building. In daily life, it is not uncommon to hear the expression "that is a good theory" being used as a polite way to dismiss a claim one does not agree with. However in academia, "a good theory" is a mark of appreciation. Kerlinger (1986) defines theory as "a set of inter-related constructs (concepts), definitions and propositions that present a systematic view of a phenomenon by specifying relations among variables, with the purpose of explaining and predicting a phenomenon." (p. 9). Carter (2011) views theory as the framework that helps improve the formulation and rigor of individual studies to enable the emergence of a more systemic set of findings across studies. But, Carter also argues that the SCM discipline has failed to develop its own theoretical basis; rather it has borrowed and integrated theories from other fields such as economics (e.g., transaction cost economy), management (e.g., resource-based view and resource advantage theory), psychology, and sociology. Borrowing and integrating theories from other fields, instead of developing home-grown theoretical bases, is not peculiar to supply chain management (Choi & Wacker, 2011).

In fact, scholars are less concerned with the way a theory was developed than with its features: Williamson (2008) posits that a good theory is simple, plausible, and testable. Carter (2011) argues that a good theory is "insightful when it surprises" (Mintzberg, 2005, p.10), identifies, and attempts to explain anomalies in patterns of observations and thoughts. Weick (1989) says that:

> A good theory is a plausible theory, and that a theory is judged to be plausible and of higher quality if it is interesting rather than obvious, irrelevant or absurd,

> obvious in novel ways, a source of unexpected connections, high in narrative quality, (and) aesthetic pleasing. (p.517)

Barney (2005) suggests that a good theory is simple, yet it sparks debate and stimulates empirical research. The next section looks into several leading SCM theories.

Sample SCM theories. Having set the stage on theory, the next section assesses the state of theoretical frameworks from the prism of which SCM is analyzed. Such frameworks include: the transaction cost economics theory, the resource-based view, the resource-advantage theory, and the resource dependence theory.

***The transaction cost economics (TCE) theory and SCM*.** TCE theory finds its root in the work of Williamson (1975, 1985, and 1991) and has been the dominant theory for analyzing transaction risks and associated contractual solutions (Leiblein, 2003). TCE among other things draws attention to the diversity of contracts in high performance economies and has provided an efficiency-based explanation of this diversity. In the field of SCM studies, Wever, Wognum, Trienekens, and Omta (2012) indicate that TCE has been used to analyze organizations' outsourcing decision to help determine which activities should be kept in-house (hierarchical contract or vertical integration) and which ones should be conducted outside company's boundaries (market contract). At a high level, TCE examines the comparative advantage of alternative types of contracts (market or hierarchical) for governing buyer-supplier transactions (Williamson, 2002).

On the one hand, market contracts are governed by price and competition; when a supplier does not meet the requirements, a buyer can switch to another supplier (Williamson 1991). On the other hand, hierarchical contracts coordinate transactions by relying on administrative controls with associated monitoring rights and capabilities

(Williamson 1991). Within the TCE framework, as was reviewed by Rightmer (2012), there are three attributes of transactions that are important in the SCM's customer-supplier relationship, namely: the level of asset specificity, the level of performance measurement difficulty, and the level of uncertainty.

Level of asset specificity. Level of asset specificity refers to the extent to which the investment an actor makes to support the transaction ties that actor to the other party to the transaction. Assets are specific if their value decreases when they are used outside the transaction for which they were acquired. This exposes the actor making the investment to the risk of opportunistic behavior. This is the risk that the counterparty to the transaction will renegotiate the terms once the investments are made (Klein et al., 1978). An example could be that of a company reopening price negotiations after its supplier has invested in specialized equipment needed to make the specific parts.

Level of performance measurement difficulty. Level of performance measurement difficulty refers to the extent to which the parties to a transaction can measure the benefits and costs the other party brings to the transaction. Performance measurement difficulty occurs when one of the parties is better informed about the value of the exchanged goods and services. This exposes the uninformed, or less informed, party to the risk of shirking behavior. This is the risk that the counterparty to the transaction puts in insufficient effort (Frazier, 1999; Ghosh & John, 1999) like a supplier shipping lower quality parts after securing the contract.

Level of uncertainty. Level of uncertainty speaks to unanticipated changes in the environment in which the transaction is embedded. These changes can expose the parties to the transaction to the risk of maladaptation; i.e., the risk of failure to adapt to

environmental changes. Gulati and Singh (1998) and Williamson (1991) make a distinction between changes for which autonomous adaptation of the transaction parties is sufficient (e.g., price uncertainty), and those that require a coordinated response (e.g., the adoption of new technologies).

In the traditional TCE model, the unit of analysis is the" transaction", and the focus is on the "contract" used to govern the transaction; it is based on the customer-supplier dyad. However a typical supply chain is made of multiple dyads. Therefore, in the SCM literature, there is a shift toward the development of a supply chain-wide TCE framework which views the supply chain as a "nexus of contracts" and takes the "interdependence between transactions" as the unit of analysis (Wever et al. 2012). The comparison of traditional TCE (single dyad) and supply chain wide TCE (multiple dyads) in both a static and a dynamic setup indicates that in the supply-chain wide TCE scenario, there is a leadership role to be played by the focal company, which has to monitor all supply chain participants either directly or through a third party. In this scenario, supply chain participants who do not have a direct relationship face higher risks due to a lack of transparency. The focal company may not get timely information on a supply shortage at the sub-supplier level; or the tier-n supplier may not get timely information on changes in market demand. In the single dyad TCE, there is more transparency between transaction parties since they operate on the basis of a contract.

In brief, Wever et al. (2012) observe that in a single dyad (traditional TCE) or in a network of dyads, the TCE model has a narrow focus on contract as the main tool for SCM and assumes that non-contractual solutions are costly. Nonetheless, contemporaneous SCM requires tools to manage many other issues such as: integration

and management of business processes, inventory and quality management systems, product tracking, and other types of information systems. It is not evident that contracts as opposed to say market forces play a dominant role in managing the aforementioned issues. The importance of TCE in SCM and SSCM stems from the fact TCE helps govern and understand the relationship and interactions among the parties to the contract. However, the challenges associated with dealing with supply chain agents with whom the focal company does not have a formal contract can hardly be managed effectively within a TCE framework. Yet, these non-parties to the contract are not less important to the effective implementation of a SSCM agenda. Other theories are needed to meaningfully address issues related to non-contracting parties; it is in this context that Carter (2011) presented TCE as just one of many other theoretical frameworks applicable to SCM. One other such theoretical framework is the Resource-Based View.

The resource-based view (RBV). Unlike the TCE, which is focused on contract and transaction, the RBV is geared toward creating or enhancing the competitive advantage of the organization (Priem & Swink, 2012). In his work on purchasing potential contribution to competitive advantage, Ramsay (2001) points out that RBV or the Resource Based Perspective (RBP) as he calls it, is perhaps the most widely accepted view of corporate strategy. Ramsay (2001) further presents the following four factors as the necessary four conditions for *the prevention* of purchasing contributing to the creation of a sustainable (here understood as robust and long-term) competitive advantage (SCA):

1. All purchasing functions must be homogeneous (functional homogeneity)
2. All purchasing functions must have information relating to the activities of all rivals purchasing functions (perfect competitor information). All relevant

resources must be available for purchase with identical purchase specifications, without restriction by any purchasing function (perfect purchased resource mobility)

3. Imitation cost must always be less than likely revenue or profits, or, if negative, the net balance must still be attractive to potential competitors (universal imitation attractiveness). (p. 41)

By first presenting the neo-classical economic conditions for *the prevention* of SCA based on purchasing activities, Ramsay has been erroneously accused by some authors like Barney (2012) of suggesting that purchasing or SCM cannot be a source of competitive advantage. As Ramsay duly noted, the analysis indicates that "the four conditions above are routinely breached in real markets" (2001, p. 45). Indeed some of the real conditions are absurd (Hunt & Davis, 2008; Ramsay, 2001). Thus, the derived necessary four conditions for a purchasing role in creating a SCA are opposites of the non-condition creating factors cited earlier. Functional heterogeneity speaks to the peculiar conditions that make a customer-supplier relationship unique. Imperfect competitor information illustrates the opportunity to be had in a relationship between supplier chain participants. Limited imitation attractiveness illustrates the cost-barriers and Imperfect resource mobility demonstrates the little risk of substitution. Ramsay makes the case that by leveraging the imperfection in both resource mobility and competitor information, and the limited imitation attractiveness, purchasing can be a source of SCA.

In reality, the persuasiveness of Ramsay's argument is compelling and, yet as indicated earlier, some authors in the field of RBV have erroneously concluded that

purchasing could not contribute to SCA (Barney, 2012; Hunt & Davis, 2008, 2012; Priem & Swink, 2012). In their 2008 article, Hunt and Davis trace the source of the error in the fact that many RBV theorists are strongly influenced by the neoclassical and the equilibrium economics research tradition. They assert the following:

> In this tradition, perfect competition is the ideal form of competition, equilibrium analyses are preferred, organizations and consumers are maximizers, demand is homogeneous within industries, innovation is exogenous to competition, mathematics is the preferred language of discourse, formal proofs and statistical tests on third-party generated data are favored, and historical evidence and statistical tests or survey data are favored. Even though many RBV theorists depart from the neoclassical, equilibrium economics research tradition in some respects, they still rely heavily on it for most of their concepts, theories, and methodologies. (p. 11)

Through its neo-classical economic foundation, RBV helps set SCM in the liberal economics context, thus helping make the case for the relevance of studying SCM in the current economic climate dominated by the free-market ideology. However, RBV tends to have a very positivist approach in its methods and concepts. Observing that neo-classical economics theorists idealize perfect competition and equilibrium analysis which are seldom found in real life, Ramsay (2001) while supporting the arguments and conclusion of RBV as a catalyst for SCA, propose that these arguments and conclusions need to be grounded in a research tradition that provides a clean break from neo-classical economics. One such tradition is the resource-advantage theory of competition.

The resource-advantage (R-A) theory of competition. R-A seeks to provide a theoretical foundation to the claim that competitiveness can be enhanced in some circumstances by social structure and trust-based governance (Hunt & Arnett, 2003). R-A defines resources as the tangible and intangible entities available to the firm that enable it to produce efficiently and effectively a market offering that has value for some market segments (Hunt & Davis, 2012). R-A is explicated using a descriptive approach, Hunt and Arnett (2003) argue that R-A does not tie its definition of resources to the creation of an advantage rather it links the definition of resources to its contribution to creating a market offering (product) whose value will yield a market place position and superior financial performance. Resources, market position, and financial performance are in a close-loop system driven by feedback and signaling.

The superior competitive advantage is the result of the firm possessing a resource assortment that enables it to produce a good that is perceived to be superior in quality and produced at a lower cost. This is the kind of benefit that focal companies seek to gain from their SCM activities; some of the resources needed such as components of good quality and delivered on time, are provided by suppliers.

As such R-A stands apart from TCE that is based on contract and transaction, and RBV that is based primarily on market forces. R-A theory's premises as presented by Hunt and Arnett (2003) make it a better theoretical lens for SCM than RBV (Hunt & Davis, 2012). R-A theory is broad in scope, eclectic in its foundation dynamic over time and more closely approximates the complex and changing multi-faceted world of SCM (Priem & Swink, 2012). Taking a broad approach to value creation, R-A has a strategic view of a firm's relationship with its customers and consumers; it views these

relationships as an important basic resource that can lead to more advantageous position in the marketplace and in turn superior financial performance (Hunt & Arnett, 2003). R-A theory, like TCE, does not accept the neo-classical economics premises of pure and perfect competition. It rather accepts real market assumptions (e.g. information asymmetry, heterogeneous and dynamic demand across and within industries, disequilibrium in competitive dynamics, diversified sources of firm's resource beyond land, capital, and labor). Thus, R-A and TCE are similar in their rejection of fundamental neo-classical economics assumptions and provide a framework that is a better fit for the dynamic and multifaceted functions of SCM and SSCM that are central to this study. The resource advantage of a firm can come from being part of a supply chain that has managed to leverage its commitment to sustainability to create a niche for its members and develop a competitive advantage not accessible to others non-members.

As a system wide approach theory, R-A theory is also more useful to SCM since it can be applied to value creation by the entire value creation system through co-creation by suppliers and buyers up and down the value system. SCM researchers have adopted the system-level view of competition through their acceptance and usage of terms such as "extended enterprise" and "virtual integration" to describe at least part of an overall system (Priem & Swink, 2012). Another conceptual prism that suits the dynamic world of SCM is that of resource dependence theory.

The resource dependence (RD) theory. RD finds its origin in the work of Pfeffer and Salancik (1978). They argue that organizations are dependent on the environment for their survival. The resulting multiple dependencies will create relationships between the focal organization and its stakeholders. Suppliers represent a set of such stakeholders

with whom the focal company has mutual dependencies (interdependence) that are developed to reduce risk in the relationship. Resources are the object of control and the source of dependence defined "as the product of the importance of a given input or output to the organization and the extent to which it is controlled by a relatively few organizations" (Pfeffer & Salancik, 1978, p. 51). As they strive for stability in their external operations (supply chain), firms will develop two generic response types for actions external or internal to the current exchange relationship: buffering and bridging (Bode, Wagner, Petersen, & Ellram, 2011).

Buffering actions. Buffering actions are attempts to gain stability by establishing safeguards that protect a firm from disturbances. Buffering is external to a current relationship as it is an effort to reduce the firm exposure to the current relationship partner and to mitigate the disturbance that the relationship may confer. An example of buffering in the SCM arena is the development of alternate suppliers to reduce a perceived risk in the relationship with a current supplier.

Bridging actions. Bridging actions are attempts to manage uncertainty through engaging in "boundary-spanning" and "boundary-shifting" actions with an exchange partner. Bridging is internal to the relationship and is an effort to manage resource dependency by enlarging the firm influence over the targeted resources (Pfeffer & Salancik, 1978). An example of bridging could be a change in the nature of the relationship with a supplier from arm-length (transactional) to strategic. Buffering and bridging actions are valid organizational responses to both intra-firm and inter-firms supply chain disruptions.

Resource dependence theory appears to have direct impact on resource transaction between the organization and its primary stakeholders (in the case of SCM that will be direct suppliers) with whom the organization has some contractual obligation. Secondary stakeholders (sub-tier suppliers) are less affected. As Van Der Laan, Van Ees, and Van Witteloostuijn (2008) postulate in their contrasting of resource dependence and stakeholders management theories, the impact of RD theory actions will depend on the relationship between the stakeholder and the firm; this distinguishes primary (or private) from secondary (or public) stakeholders. On the one hand, although farther from the focal company, the secondary stakeholder might have more control (power) over the resources. On the other hand, the focal company can enhance its control of resources by diversifying its supply base; the resulting asymmetry in the exchange relationship will confer greater powers to the buying organization (Hofer et al., 2012; Pfeffer & Salancik, 1978). In an empirical study of Wal-Mart and Target that looked into the collaborative perspective of resource dependence theory, Hofer, Jin, Swanson, Waller, and Williams (2012) found that:

> Suppliers who engage in supply chain relationships with key retail account (KRA), customers may have an improved performance depending on the varying levels of the suppliers' and KRA market shares. Supplies that depend on their KRAs for a significant share of their revenues relinquish some of their leverage in the marketplace, but as the KRAs gain market share, their suppliers' performance tend to increase. (p. 412)

Stakeholder theory. Stakeholder theory is based on the work of Freeman (1984) who asserts in his book *Strategic Management: A Stakeholder Approach* that "market

forces, firm resource factors, and socio-political forces converge when managers are making decision that are contingent on moral or ethical criteria" (as cited by Thornton et al. 2013, p.69). Accounting for other stakeholders' demands beyond the profit/return-centered shareholders' view is likely to contribute to the "augmented product" of the firm. As McGuire, Sundgren, and Schneeweis (1988) put it, if the firm disregards the expectations of these other stakeholders it risks turning implicit claims like quality service and social responsibility into explicit claims thus raising its cost of doing business. For instance, failure to meet promises, implicit claims, made to government officials on environmental issues could lead to the latter passing more stringent regulations, which constitute explicit claims, to force the firm to act in a socially responsible manner.

In conclusion, theory development in the field of SCM, the assertion that "there is nothing as practical as a good theory" (Lewin, 1943, p. 169) is well a propos: the field of SCM that is often proud of its practical tradition: SCM can be at least in part credited with fueling the growth of massive corporations such as Wal-Mart; winning major military conflicts like the American Civil War and World War II, and enhancing civilization (e.g., trade along the Silk Road). However, there is a lurking peril in intuitively accepting that practical matters and conceptual theory building diverge. Nothing can be farther from the truth as poor theory can be disastrous. This was proven by the Mayan's theory that their sun god required human sacrifice in order for the sun to move on a daily basis. Professionals and scholars should argue for, and take the practical benefits that arise from good theorizing (Wever et al., 2012). After an overview of the

literature on sustainability and SCM taken individually, the next section reviews the state of the literature on the integration of SCM and sustainability

Sustainable Supply Chain Management

The integration of sustainability and SCM will constitute the core of this work as the intersection of the two themes is the focus of this study. Integrating sustainability and SCM is a growing challenge for businesses; operational efficiency is no longer treated as a uni-dimensional construct. SCM has to account for externalities such as the environmental and social impact of its activities (Pagell & Wu, 2009). Bridging the divide between SCM in particular and business in general, and sustainability or social responsibility has been and continues to be the topic of epic exchanges in the business and academic worlds. It is in the framework of these exchanges that Milton Friedman (1970) in a provocative but insightful manner argued that the social responsibility of business is to increase its profit. In the term "social responsibility of business," Friedman saw nothing more than an attempt by some to preach socialism. However, Friedman is less opposed to business engaging in environmental and social actions than to the moral pretext under which business should engage in social responsibility. He argues the following:

> Of course, in practice the doctrine of social responsibility is frequently a cloak for actions that are justified on other grounds rather than a reason for those actions. To illustrate, it may well be in the long run interest of a corporation that is a major employer in a small community to devote resources to providing amenities to that community or to improving its government. That may make it easier to attract desirable employees, it may reduce the wage bill or lessen losses from pilferage

> and sabotage or have other worthwhile effects. Or it may be that, given the laws about the deductibility of corporate charitable contributions, the stockholders can contribute more to charities they favor by having the corporation make the gift than by doing it themselves, since they can in that way contribute an amount that would otherwise have been paid as corporate taxes. (p. 5)

Milton Friedman seems to argue for a CSR approach to business only so long as it supports the economic and financial interest of the corporation. In contrast, approaching the issue of social responsibility from a more macro and consequential angle, Brown (2006) sees a societal peril in letting individual micro economic decisions go unchecked or uncoordinated to some extent. Taking the example referenced earlier of the food and fuel markets competing for the same commodity, he argues that if the fuel value of a commodity is higher than its food value, the commodity will turn into fuel; this could have some far reaching social consequences.

Since this study covers the impact of SSCM on firm's performance, it is important to assess the state of the literature on SSCM and corporate performance. The next section reviews SSCM as it relates to operational, reputational, and financial performance. The section closes with a review of the literature on the effects of moderating variables (industry collaboration structure, company size, and regulatory framework) on the relationship between SSCM and corporate performance.

SSCM and Performance

SSCM is fostered if it contributes to corporate performance. Drawing from stakeholders' theory and channel relational reciprocity literature, Luo and Zheng (2013) conclude that "joint CSR strength of both buyers and sellers positively influences channel

relationship performance" (p.210). Approaching the issue of channel performance from a similar angle, Hall, Matos, and Silvestre (2011) say that reaping the performance benefit of SSCM requires collaboration with suppliers because the sustainability of a company is tributary to that of its supplier chain. The following reviews SSCM contribution to operational, reputation and financial performances.

SSCM and operational performance. Operational performance is defined as performance focused on business aspects related to operational efficiency, such as cost, quality, flexibility, and speed (Golicic & Smith, 2013). SSCM is thought to influence operations-based performance; the commanding role of the focal company is envisioned to create a ripple effect throughout the supply chain. Suppliers that are in synch with the customer on SSCM requirements are more likely to better contribute to improved speed to market, product quality, and cost efficiency initiatives.

SSCM and reputational performance. CSR initiatives like SSCM are often associated with the idea of "doing good", as a reference to improved corporate image expressed in terms of "enhanced brand attributes and value leading to greater customers attraction, retention and trust, and new marketing opportunities" (Mason & Simmons, 2014, p.820). CSR activities also improve internal reputation in the eyes of employees (Glavas, & Godwin, 2013).

According to Tate, Ellram, and Kirchoff (2010) corporations used CSR and SSCM reports to reassure investors, customers, NGOs, and governments that their environmental and social performance expectations are being met. This risk mitigation exercise can also be an image booster for companies whose SSCM and other CSR actions can be viewed as deliberate attempts to influence public opinion. This reputation may

also correlate to long-term performance and "can act as an intangible inimitable resource for the firm" (p.22) thus creating market advantage and barrier to entry. SSCM is particularly beneficial to the image of companies in "the manufacturing sectors like automotive, consumer products, and electronics where 70% of the organization value added may be purchased from other organizations" (p.27). In the words of Wang and Bansal (2012), the sustained legitimacy that results from SSCM could provide the focal company with the ability to charge premiums for products and/or services, recruit and retain employees, and attract investors or capital providers.

SSCM and financial performance. Firms who engage in SSCM and practice Socially Responsible Supplier Selection (SRSS) could enjoy financial performance advantage over rivals (Thornton, Autry, & Glicor, 2013). There is compatibility between the ethical principles of SSCM and the profit-seeking goal of business (Mason & Simmons, 2014). But Golicic and Smith (2013) note that SSCM's effects are less pronounced on accounting and financial performance than on operational performance. Tate et al. (2010) actually observe that SSCM contribution to financial performance is indirect and goes through the mediation of operational performance or access to low cost of capital: lenders are more inclined to grant favorable loan terms to a company that is part of a SSCM scheme, because of the perceived lower risk that comes with SSCM. Delmas, Etzion, and Nairn-Birch (2013) corroborate this when they postulate that in the area of SSCM, financial performance is associated with process not outcome and has a high positive effect on stock price and access to capital market.

Barnett and Salomon (2012), McGuire et al. (1988), and Wang and Basal (2012) are more nuanced in their assessment of SSCM contribution to financial performance.

Barnett and Salomon (2012) argue that the relationship between SSCM and financial performance is contingent on management of the focal company ability to leverage their accrued stakeholder influence capacity (SIC) to turn the reputational and operational dividends of SSCM into financial benefits. McGuire et al. (1988) find that prior firm performance is a better predictor of its commitment to sustainability, thus financial performance could be the antecedent of corporate commitment to social responsibility in different functions including SCM. They also suggest that sustainability "may influence various aspects of corporate performance in different ways" (p.869). On the other hand, Wang and Bansal (2012) posit that CSR actions will procure economic benefit if they are coupled with a long-term orientation, which will "positively moderate the relationship between CSR activities and financial performance" (p.1147). These three studies establish a contingent relationship between sustainability activities and financial performance, although not directly called out in this study, the role of factors such as SIC, past financial performance, and long-term orientation is indeed critical for SSCM actions to impact financial performance. This study is focused on a different set of variables that are thoughts to moderate SSCM effects on performance as seen below.

SSCM Impact on Performance and Moderating Variables

SSCM is more complex because it involves two dimensions of complexity namely the coordination of supply chain members and the interactions among environmental, social, and economic elements (Hall et al., 2011; Perera, Perera, & Wijesinghe, 2013). The coordination of supply chains members is thought to be influenced by the size of the focal company, industry collaboration, and the regulatory

environment. These variables are the moderators of the relationship between SSCM and performance in this study.

SSCM and size of the focal company. Contrarily to Golicic and Smith (2013) who found that "any size firm should be able to achieve similar positive results from environmental supply chain practices" (p.81), Tate et al. (2010) think that because of their relative vulnerability to reputational risk and limited resources, smaller firms have more at stake in SSCM than larger companies. Larger firms are also the main target of scrutiny and are consequently inclined to factor SSCM into their corporate strategy (Fombrun & Shanley, 1990). The size of the focal company will affect its ability to set and pursue an agenda for its supply chain. Smaller companies who embarked on a SSCM agenda can often benefit from industry collaboration that could help lower their cost.

SSCM and industry collaboration. Golicic and Smith (2013) note that in the field of SSCM industry does matter. They observe that on environmental issues "the automotive industry has achieved the best results . . . This industry has received a great deal of attention with respect to environmental initiatives" (p.90). Increasingly industry associations like the Automotive Industry Action Group (AIAG), the Electronic Industry Citizenship Coalition (EICC), and Aerospace Industry Association (AIA) have developed tools like codes of conduct for ethics and working conditions, and standard environmental compliance requirements to be used by all their suppliers. This collaboration at time spans over multiple industry associations as is being evidenced with telecommunication industry association called Global e-sustainable Initiative (GeSI) collaboration with the aforementioned industries associations to tackle their members reporting requirements on conflict minerals as required by the US Dodd-Frank Act of

2010. This study envisages that the level of collaboration among companies to tackle issues of sustainability within their common supply chain is likely to positively affect the relationship between SSCM and participating firm's performance. This collaboration is susceptible to lower compliance cost by commonizing and standardizing compliance tools, and help other supply chain participants who may not be compelled by laws and regulations to follow the same SSCM requirements.

SSCM and the regulatory framework. The regulatory framework is thought of having a catalyst and multiplier effect on SSCM effect on performance. This regulatory framework is part of the set of external pressures susceptible to significantly and positively influence SSCM adoption (Liu, Yang, Qu, Wang, Shishime, & Bao, 2012). This is confirmed by the effect that the Organization for Economic Cooperation (OECD) Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas combined with Section 1502 of the U.S. Dodd-Frank Act and the related Security and Exchange Commission (SEC) rules had on companies and industry efforts to rid their supply chains' of minerals mined in conditions that contributed to armed conflicts and violence in mining communities. In this study, the regulatory framework is seen as a catalyst for enhanced SSCM contribution to firm's performance: if a company SSCM agenda is supported by a legal mandate, then it is less likely to put the company in an unfavorably competitive position. Furthermore an SSCM agenda based on a regulation is likely to provide first adaptors' advantage to leading companies and enhance their performance.

SSCM Implementation and Theories

In order to instill discipline, rigor, and methods into the implementation of SSCM, many theories have been proposed and adopted. These theories will be discussed to see how they compare to theories of SCM and sustainability. The implementation of SSCM has taken multiple facets that can be classified as reactionary or proactive. The proactive approach is based on initiatives aiming to integrate SSCM into routine business functions throughout the enterprise. Some have indeed attempted to integrate both reactionary and proactive tools to both remedy ill-designed past practices and to chart a better path for the future (Svensson & Wagner, 2011, 2012). The reactionary approach is for the most part addressed in Green Supply Chain Management (GSCM).

Green supply chain management (GSCM). Following the push from policy makers and activists for "going green" multiple companies have embarked on GSCM initiatives (Steger et al., 2007).The concept of GSCM emerged in the 1990s and includes the reactive monitoring of the environmental impact of operations along the supply chain (Xie & Breen, 2012). GSCM takes environmental elements into consideration when managing the supply chain. Similarly, Zhu, Sarkis, and Lai (2008) assert that "the scope of GSCM practices range from green purchasing to integrated life-cycle management of supply chains flowing from suppliers, through to manufacturer, customer and closing the loop with reverse logistics" (p. 262). This holistic view of GSCM is in line with the following definition offered by Zsidin and Siferd (2001, p. 69) and reinforced by Shi, Koh, Baldwin, and Cucchiella, (2012)

> green supply chain management is the set of supply chain management policies held, actions taken and relationships formed in response to concerns related to the

> natural environment with regard to the design, acquisition, production, distribution, use, reuse and disposal of the firm's goods and services. (p. 55)

Remaining faithful to the above definition, Shi et al. (2012) explored a link between GSCM and the natural resource based view (NRBV). NRBV argues that it is a firm bundle of resources rather than a product deployment of those resources that determines its competitive position. Also, according to NRBV, in order for a resource to contribute to a sustained competitive advantage, it must be valuable, non-substitutable, inferred, socially complex or rare (Hart, 1995; Markley & Davis, 2007). Markley and Davis (2007) further assert that aligning NRBV and the TBL model (environmental, social, and economic) is a powerful strategic tool to gain a competitive edge.

Likewise, the intersection between green lean and global along the supply chain is thought to have the potential to create a competitive edge for affected companies (Mollenkopf et al., 2010). However, extrapolating NRBV to the supply chain represents a significant challenge because competing focal companies in the same industry often share the same supply base and will have to figure out a way to cooperate with competitors; this is at least certain in the automotive industry. Furthermore, the GSCM movement leads to increased consumer' demand for "greener" products (Hitchcock & Piper, 2012); this pushes businesses to remedy perceived lack of "greenness" in their products, operations, and supply chain.

The reactionary side of the GSCM is portrayed in the abundant use of the present continuous tense term "greening" the supply chains (Bjorlund, Martinsen & Abrahamsson, 2011; Colicchia, et al., 2011; Rao & Holt, 2005; Xie & Breen, 2012), which also indicates the idea of continuity in the process. Here again the literature is

replete with physical environment related topics such as eco-design, environmental management, environmental engagement (Holt & Ghobadian, 2009; Zhu et al., 2008), and very few articles dedicated to the application of GSCM to social issues. Also, large companies are viewed as playing a key role in promoting GSCM through their influence on their suppliers and policy makers (Zhu et al., 2008).

Complementary to GSCM, the Green Supply Chain Practice (GSCP) as an operational jargon aims at translating GSCM concepts into actionable tasks. Environmental collaboration and monitoring are presented as the two pillars of GSCP (Vachon & Klassen, 2006). Both authors further argue that greater supply chain integration and collaboration are operationally beneficial to managing the environment. Integration, collaboration, and monitoring of the supply chain are negatively correlated to the number of direct suppliers, hence presenting a challenge for the purchasing function, which often tends to have multiple sources to create competition and improve the economic-leg.

The literature also deals with the issue of "green purchasing" as a subset of GSCM. "Green purchasing" is defined as the process of formally introducing environmental issues and concerns into the purchasing process in a way that minimizes the negative environmental impact of the inbound supply chain (Rao & Holt, 2005). Colicchia et al. (2011), offer the following four criteria as tools for minimizing the environmental impact of inbound supply chain in accordance with green purchasing initiatives:

- Suppliers' requirement to have an environmental certification, like ISO 14001
- Purchase of eco-labeled products

- Integration of environmental criteria into the supplier assessment system
- Environmental collaboration with suppliers

Taking "greening" from the field of operations to that of strategy was also found to significantly contribute to increased competitiveness and improved economic performance (Rao & Holt, 2005). But, this may be hard to quantify and link to the improved economic performance attributable to greening actions. Conceptually, however, one can perceive some benefits associated with "greening" even though it is not easily measureable and quantifiable. As Shi et al. (2012), put it the adoption of NRBV and GSCM will eventually lead to favorable corporate environmental and financial performance.

GSCM has also taken the form of reverse logistics which is defined as the return of recyclable or reused products and materials into the forward supply chain (Colicchia et al., 2011). Reverse logistics manage the upstream flow of collected used or returned products in order to reduce the harmful effects of consumerism. Its popularity has increased with the growing interest in SCM (El Saadany, Jaber & Bonney, 2011). Although some see it as a subset of GSCM, reverse logistics is different in the sense that it deals with an "after-production" process, coming into action after the product has been delivered to the market. Whereas as GSCM for the most part deals with upstream activities in the production process such as first time purchasing, production, and warehousing (El Saadany, et al., 2011). GSCM is reactionary to some extent, and not necessarily based on a methodological and theoretical approach to SSCM implementation. The implementation of SSCM does not appear to follow a specific theoretical framework and some argue that because of the relative youth of SSCM, there

is little theoretically grounded research on the topic. For instance, at the intersection of green and global supply chain strategies, there are only two known such theoretically grounded research paradigms, namely, the New Development Paradigm (NDP) and the Sustainability Framework (Mollenkopf et al., 2010). But, there are additional conceptual frameworks for the implementation of SSCM that have been developed and are being used.

The New Development Paradigm (NDP). It focuses on the environmental, social, and economic impact of multinational firms (Dunning & Fortanier, 2007).

> The New Development Paradigm (NDP) integrates the theoretical and empirical views on development that have gained prominence since the mid-1990s. In particular the multifaceted nature of development objectives – including social and ecological development next to economic growth – and the critical role of institutions in the development process characterize the NDP. This new perspective has important consequences for understanding the role of Multinational Enterprises in fostering development. (p. 25)

The NDP framework is macroeconomic and political. This is reflected in the UN Millennium Development Goals, a set of the following eight development goals that governments worldwide have committed to achieve by the year 2015:

1. Eradicate poverty and hunger
2. Achieve universal primary education
3. Promote gender equality
4. Reduce child mortality
5. Improve maternal health

6. Combat HIV/AIDS, malaria, and other diseases

7. Ensure environmental sustainability

8. Develop a global partnership for development

The Sustainability Framework (SF). SF is based on the following distinct but complementary theories: resource dependence theory (RD), transaction cost economics (TCE), population ecology, and the resource-based view (RBV) of the firm. These theories are rooted in the fields of social sciences (sociology, political science, economics. . .), strategic management, and the theory of competitive advantage (Carter & Rogers, 2008).

Accounting for the environmental, social, and economic aspects of sustainability, as the NDP theory does (Dunning & Fortanier, 2007), the sustainability framework (Carter & Rogers, 2008) clearly puts the three pillars of the TBL in an optimization framework. Carter and Rogers (2008) illustrate how sustainability is the result of the intersection of the environmental, social, and economic aspects of business management: the intersection is rated on a three-level scale: good, better and best**.** Good marks the intersection of the social and environmental factors. Better denotes the intersection of the economic (financial) with either the environmental or social factors. Best finally defines the confluence of all three factors: environmental, social, and economic.

The SF complements the NDP with a strategic management view. This helps build a more holistic theoretical approach to the field of SSCM. The need for strategic theoretical ground work in SSCM is echoed by Mollenkopf et al. (2010). In order to help conceptualize lean, green, and globalization, they affix strategy-structure performance (SSP), political economy paradigms (PEP), and network theory (NT) to the theoretically

grounded research approaches of NDP and the sustainability framework referenced above:

The SSP approach is meant to add strategic impact by highlighting the structural requirements in order to facilitate the joint implementation of lean, green and global supply chain strategies and leads to a better understanding of performance from the simultaneous implementation of these strategies. The PEP can be used as a conceptual framework for how firms manage lean, green and global supply chain strategy because it incorporates both behavioral as well as economic factors and by its nature considers the inter-firm context. The NT also employs an inter-firm and inter-functional approach necessary to study supply chain decisions. Supply chains and supply networks are continuously emerging, self-organizing, dynamic and evolving. The network view includes explanations about extended relationships amongst actors in the network and is not restricted to a dyadic perspective.

Internalization/Externalization Theory. Widely used in international business, the internalization/externalization framework has recently been applied to suppliers' development (Vachon & Klassen, 2006). The internalization/externalization framework proposes that firms can conduct their activities through market (externalization) or incorporate those same activities into their organizational hierarchy (internalizing). The firm can apply this approach to social or environmental management in the supply chain through internalization and externalization.

Internalization. Internalization speaks to social activities in the supply chain that are related to working conditions. Thus, the firm could dedicate resources to define and implement a working conditions certification of its suppliers. This involves activities

such as training, conducting audits, and corrective action plan implementation and verification. This approach is referred to as social collaboration (Vachon & Klassen, 2006).

Externalization. Externalization refers to how the firm will employ market-based mechanisms to improve suppliers' environmental performance outside of its operations. Taking the case of the environmental certification the company may rely on external certification like the ISO 14001, which is conducted by a third party and often paid for by the company being audited. This approach is often referred to as environmental monitoring (Vachon & Klassen, 2006). On the social front, firms with a supply base extended into developing countries have increasingly adopted standards like the Social Accountability International, 8000 (SA 8000) which sets basic requirements for work practices in internal operations throughout the supply chain (Awaysheh & Klassen, 2010). SA 8000 explicitly covers nine areas:

- Child labor
- Forced labor
- Health and safety
- Freedom of association and collective bargaining
- Discrimination
- Disciplinary practices
- Working hours
- Compensation
- And related management systems

In practice, many companies will use a hybrid of both monitoring and collaborative approaches to manage their internalization/externalization framework since these are conceptual references aimed at creating some intellectual clarity approach to operational activities that are seldom sharply delineated.

The Transparency/Dependency/Distance Model. Another theoretical model aimed at framing a conceptual framework for SSCM as it relates to social issues is that of tripartite among transparency, dependency and distance. It is based on the fact that the location of suppliers and the nature of the form of interaction between members of the supply chain have social implications that cannot be ignored (Awaysheh & Klassen, 2010).

Transparency addresses the extent to which information within the supply chain is readily available to end-users and everyone else in the supply chain. It deals with increasingly important social issues related to origins of commodities such as diamonds, organic foods, and conflict minerals. Dependency speaks to the degree to which a firm relies on other members of the supply chain for critical resources, components or capabilities. Distance becomes less important when suppliers and the focal company are serving local customers or suppliers thus operating in the same macro environment. They are expected to move in tandem as far as social issues are concerned. However, as the distance between the firm and its suppliers increases, they are confronted with issues of information gathering, assessment, and implementation (Klassen & Vachon, 2003).

Distance encompasses three sub-dimensions: geographical, cultural, and organizational distance (Awaysheh & Klassen, 2010). The geographical distance refers to space or physical separation between the focal company and the supplier. The

geographic distance leads one to view the other as having less commitment to social issues. This will often trigger monitoring or audit to help overcome the real or perceived shortcomings of the other party (Koplin, Seuring, & Mesterbarm, 2007). The cultural distance is often the corollary of the geographic distance and reflects the differences that exist in the cultures of the societies in which the firms are based. The organizational distance deals with the length of the supply chain or the number of firms that exist between the focal firm and the suppliers: the greater the organizational distance, the higher the complexity.

Awaysheh and Klassen (2010) noted that the three forms of distance are not necessarily highly correlated and need to be addressed with more discernment. Nevertheless, they argue that taken collectively, as the three dimensions of distance increase, the focal firm is likely to adopt a stronger set of suppliers' socially responsible practices to manage the distance, differences in culture and organizational complexity. Beyond the geographic and cultural distances, the organizational distance is particularly important to this study because it speaks to the challenges associated with engaging and getting the attention of a supply chain participant with whom the focal company, who seeks to promote a SSCM agenda, does not have a direct relationship or a contract as contemplated by the TCE.

The Base of the Pyramid (BOP) Model. The BOP model is focused on the problem of social exclusion, BOP scholars argue for a different business model that will allow the inclusion of impoverished communities in the modern economic systems (Hall & Matos, 2010 and Prahalad & Hart, 2002). They suggest that supply chain professionals should include suppliers from poor communities in order to devise a

sustainable supply chain. This view is based on the following premise of Adam Smith (1776) echoed by Hall, Matos, Severino, and Beltrao (2009): "no society can surely be flourishing and happy, if a greater share of its members are poor and miserable." (p. 578). As evidenced with the case of Brazil, social exclusion following the modernization of its agriculture, often leads to more serious issues such as crime and corruption (Hall et al., 2009). Hart (2007) argues that as opportunities in the top of the pyramid (TOP) mature, markets in industrialized nations are increasingly saturated and new opportunities should be sought in the BOP. Early BOP research was based on the perspective that multinational corporations will benefit by turning impoverished people into consumers (Calvano, 2007). But, there is growing call for research to explore how these poor communities can participate as suppliers within the global market system (Kandachar & Halme, 2007). The BOP discourse has to be empirically tested given the power asymmetry between multinational corporations and local communities. The latter not only lacks basic business knowledge but also regularly exhibit mistrust of industries and government policies (Hall & Matos, 2010). The BOP model is relevant to this study because one can envisage a focal company leveraging the recommendation of the BOP to turn SSCM into a strategic advantage as it deals with a supply chain that is based in an impoverished community, to enhance its reputation.

Contingency Theory. The contingency theory seeks to set SSCM in a broader grounded theoretical framework. Some authors like Walker and Jones (2012) have approached SSCM theory in a relative manner. Contingency theory suggests that no single organizational structure is inherently more efficient than all others. Depending on the task they perform and the environment they face, the appropriate organizational

structure is in each case a function of such factors as technology, market, and the predictability of tasks. A contingency theory approach to SSCM has been adopted by authors including Stonebraker and Jianwen (2006). Following along the same line, Walker and Jones (2012) have developed a typology of SSCM that is based on the perceptions of internal and external barriers, and enablers. Keeping with the contingency theme the perception of these factors, rather than their nature, is what defines their classification as enablers or barriers. The relevance of this theory to the study stems from the fact that it seems to establish a relationship between SSCM and performance based on the company's ability to leverage its relationship with stakeholders and issues classified as internal or external.

Grey System Theory and Neighborhood Rough Set Methodology. The Grey System theory and Neighborhood Rough Set Methodology have limited use in SCM so far. In SCM, much of the grey system theory application has been in the area of supplier selection. Little research has focused on the application of Grey Systems Theory to other aspects of supply chain management (Bai, Sarkis, Wei & Koh, 2012). Grey System Theory can be used to solve uncertainty problems in cases with discrete and incomplete information. It has the advantage of being able to generate satisfactory outcomes using small amount of data or data with great variability in factors. It is complemented by the Neighborhood Rough Set Methodology which was developed as a non-parametric data-mining approach that can effectively determine core relationships amongst a variety of factors (Bai et al., 2012). Rough Set Method classifies objects into similar classes (clusters) containing objects that are discernible with respect to previous occurrences and knowledge (Bai, Sarkis & Wei, 2010a; Pawlak, 1982). The supply chain application of

rough set is only a recent occurrence in the areas of suppliers' selection (Bai et al., 2010a; Li, Yamaguchi & Nagai, 2008; Tseng, Chiang & Lan, 2009), supply base consolidation and benchmarking (Parmar, Wu, Callarma, Fowler & Wolf, 2010) and green supply chain and operations management (Bai, Sarkis & Wei, 2010b). Grey System Theory and Rough Set Methodology are the only applications of quantitative theories to SSCM that have been identified; this is further corroborated by Bai et al., (2012) when they assert the following:

> We note that the proposed methodology in this paper is the first time that neighborhood rough sets have been integrated with grey scale measures and applied to supply chain management issues. It is also the first time it has been applied as a tool to evaluate environmental performance of organizations, whether it is for supply chain or organizational performance. (p. 81)

The relevance of this theory is derived from its ability to help a focal company distinguish among its suppliers on the basis of criteria such as the commitment to SSCM. A focal company that takes an aggressive approach to its SSCM agenda can use Grey System Theory and its Neighborhood Rough Methods to select suppliers based on this criterion and improve its chances to achieve a desired level of performance sooner.

Summary

This literature review covered the state of the research on SSCM. SSCM is clearly an integration of two major constructs namely: sustainability as captured in the TBL and SCM. The latter construct viewed from the prism of the focal company and its supply base has been extensively studied in the literature and covers topic such as

logistics, procurement, and purchasing. In the SSCM area, the construct of sustainability is relatively newer and is based on the following four tenants:

- Principle
- Economic
- Social
- Environmental

Building from the ideas of Carter and Rogers (2008) and adding to their conceptual framework, this study offers to integrate the principle-pillar into that model such as to bring up the effect of the principle pillar (i.e., value-based or business savvy). The principle-pillar is the overarching reason for adopting the TBL and not a measureable component of the model. The principle-pillar is the envelope that keeps and pushes all other three pillars to come together. In the process, these pillars reduce their individual size to the benefit of their areas of intersection. Accepting such a model in the area of SCM requires all participants in the value chain to espouse the idea that they are all members of a new virtual organization with a common destiny.

Coupled with the leadership role of some selfless business leaders who espouse the idea of "doing better by doing good" (Laszlo, 2008), sustainability in the business world has gained traction thanks to the leadership role of the United Nations and other similar institutions, which sought to encourage businesses to help preserve and respect human rights by creating platforms where business leaders, governments, and civil society can exchange ideas on the topic. Although human rights by definition are the duty of States, the growing power of business has created a new dynamic in which governments alone are increasingly limited in promoting and respecting human rights

practices without the positive support of corporations. Governments alone are no longer able to guarantee the respect of human rights since they are being increasingly supplanted by corporations whose role, size, and power in the global economy is beginning to significantly dwarf that of nation-states. The challenge for business leaders is to integrate the two broad constructs of SCM and sustainability in a way that supports the business goal of creating value for its shareholders while minimizing the damage to the environment and society.

Findings

This review has helped uncover four key findings on how the literature deals with SSCM. These are: the conceptual frameworks, the operational tenants, the type of publication treating the topic, and finally the prism of analysis of the authors.

Diverse conceptual frameworks. On the theory front, academic publications on SSCM have used many theoretical grounded research frameworks. Those noted in this literature review were characterized by their relative scope and depth, and include the following:

- New Development Paradigm
- Sustainability Framework
- Internalization /Externalization Approach
- Transparency/Dependency/Distance model
- Base of the Pyramid Model
- Contingency Theory
- Grey system theory and Rough Neighborhood Theory

The second finding of the study deals with the operational tenants of SSCM as described below.

The operational tenants of SSCM. From an operational point of view, the success of a sustainability approach to SCM owes a lot to a principle-approach to the issue: without a value-based commitment to integrate social, environmental, and economic factors into supply chain management, the success of the endeavor is at best limited. This is probably why a significant portion of publications on SSCM is from authors in the field of business ethics and CSR. Also, to be successfully implemented, SSCM needs a boundary-less collaboration throughout the supply chain. Although suppliers are often shared across industries and sectors, entities in the supply chain are loosely connected; they have no real relationship beyond the contract linking a direct customer and a direct supplier. This situation seems to indicate that SSCM will contribute to the firm performance if the focal company is capable of creating an alignment of purpose throughout the supply chain. The third set of findings revolves around how different sources of the publication treat SSCM.

Distinction based on the source of publication. On the one hand, business ethics, environmental, pro-social, and clean-production journal articles seem to edict environmental and social mandates that corporations have to meet. This is done almost without consideration of the financial and operational burden of such requirements; thus presented, SSCM does not seem to support firms economic performance. On the other hand, publications in SCM, decision science, production, and operations journals and the likes look at SCM as the core issues around which revolve peripheral issues such as sustainability and globalization: tenants of this approach postulate that SSCM is justified

only so long as it supports the firm economic performance. At the center, there are business processes and economics oriented journal publications that tend to show a more balanced and holistic view in their approach of integrating the economic side of sustainability with its environmental and social aspects. In this context, SSCM is viewed as a possible enhancer of economic performance. The fourth and last finding deals with the theme and prism of analysis used to speak to the issue of SSCM.

Distinctions based on themes and prisms of analysis. The literature points to the fact that there is almost an unstated consensus to treat the financial or economic aspect of sustainability as the "step-child" of the concept: sustainability is being presented as a euphemism to mean social and environmental issues. There is seldom an acknowledged consideration given to the issue of the financial viability of any sustainability mandate. In this context, SSCM is sought for its own sake, or as part of a sustainability agenda, regardless of its contribution to economic performance.

Publications also appear to have a consensus around the fact that between the social and environmental aspects of sustainability, the latter is more advanced in terms of being clearly defined and measured with industry wide standard tools such as the ISO 14001 certification requirements. Whereas mitigation of social issues is left to individual companies' initiatives; the adoption of SA 8000 remains timid.

Some see sustainability as a tool that can be leveraged to promote protectionism by developed countries. This fear is more prevalent in developing nations, where smaller and weaker businesses face the threat of being barred from developed nations' market if they are not able to meet environmental and social standards that they do not necessarily embrace nor do they have the means to comply with. However suppliers who meet those

requirements will enjoy a competitive edge over their peers In this case, SSCM can indeed be a springboard for access to new markets and a potentially enhancer of economic performance.

The integration SCM and TBL has been the subject of a growing and diverse body of literature from different sources. The major sources of publication on the topic for this study are the *Journal of Business Ethics,* the *Journal of supply Chain Management* and *Supply Chain Management: an International Journal*. These three journals constitute about half of the references reviewed for this literature review. As indicated by their titles, these three journals are dealing with the two sub-constructs of SSCM and their domination of the field could have been expected. The other half of the references are from publications dealing with topics as diverse as operations management, logistics, and material management.

How publications deal with each of the four pillars of sustainability (environmental, social, principle, and economic) are noteworthy and revolve around four main points:

The seldom mentioned principle-leg. With the exception of articles in the *Journal of Business Ethics*, Cavanagh's book (2008), Gibson's (2001) paper and the Mollenkopf et al. (2010) article, the principle leg, which is a deliberate and deeply rooted commitment to TBL, is silent or assumed throughout most of the literature. But as pointed out earlier, this principle commitment is the federating element of the other three pillars. Without the principle leg, devotion to sustainability is at best dependent on business cycle and external influence rather than on a genuine internal value-base decision to make TBL an integral part of the way SCM is run.

The prevailing environmental-leg. The literature review points out that sustainability is at times regarded as synonymous with environmental issues in the field of SCM. Many articles deal in some way with the topic of the physical or natural environment. This is corroborated by the prominence of ISO 14001 certification, which dominates the field of manufacturing as a standard certification for environmental compliance. Also, governmental agencies like the Environmental Protection Agency (EPA) in the United States and ministries in other nations are mandated with caring for and making sure business practices and operations are protective of the physical environment, and they do so via different schemes such as Corporate Average Fuel Economy (CAFE) and carbon trading initiatives.

The lagging social-leg. Although called out in terms like CSR and human rights, which are at the core of sustainability, only a minority of articles deal directly with social issues. The most mentioned social standard Social Accountability 8000 (SA 8000) was referenced only a few times in the literature, moreover it is not widely used by business. This is not to say that businesses are ignoring the social aspect of TBL, but they tend to deal with it internally rather than externally (i.e. in collaboration with others including competitors and suppliers). Businesses prefer to design and conduct their own social (working conditions) audit rather than rely on cross sectors and cross industries' standards. This could be explained at least in part by the non-standard nature of working conditions issues as opposed to the afore mentioned environmental issues that are for the most part, known and common.

The assumed economic-leg. Somewhat similar to the principle pillar, the economic leg of sustainability is also assumed and dealt with via a deductive method: if

an article addresses both the social-leg and environmental-leg then it is somehow dealing with the economic-leg. The reason for this probably lies in the fact the main goal of business is economic (create wealth for its owners). However, some articles are explicitly dealing with the economic aspect of sustainability either from the stand point of the risk effects of diverting resources from profit- seeking activities to social and environmental ventures or how to leverage the other pillars to enhance SCM ability to be a profit generator for the business. Other articles delve into the operational value of sustainable SCM practices as they deal with resilience, transparency, and value analysis (Juttner & Maklan, 2011).

To conclude, this review of scholarly work on the theory of integrating SCM and sustainability has enabled a review of the state of publications on the topic of SSCM. In the process, it was noted that similar to SCM, SSCM does not have an indigenous theoretical framework rather it borrows from the theoretical framework of other fields of study such as economics, ethics, and sociology. Nonetheless, as it was pointed out earlier, the scarcity of home-grown theory in itself is not an issue as long as the theory is relevant to the topic at hand.

There appears to be a consensus that, be it from a value-based or business-shrewdness standpoint, SSCM as well as TBL are viable business philosophies. The point of divergence may reside in the specific motives that drive businesses to embark on the TBL agenda. Authors such as Milton Friedman think that the decision to adopt TBL should be left to business managers who should decide solely on the ground of the profitability of such endeavors. The opposing argument is led by authors like Lester Brown (2006) who seem to think that businesses could cause remarkable harm to society

at large if their micro-economic decisions are not guided by some macro compass that looks at the overall societal impact. Mindful of this challenge, Elkington (as cited by Jeurissen, 2000) concurs that "capitalism and sustainability do not make easy bedfellows" (p.229). Jeurissen (2000) further argues that TBL is the ultimate solution to environmental and social issues caused by businesses because "capitalism can be as much the solution to the present sustainability crisis as it is its cause ," and "business is sustainable when it lives up to the triple bottom line of economic prosperity, environmental quality and social justice" (p.229).

More in-depth research on the social aspect of SSCM could help correct the imbalance displayed in the literature, which is heavily tilted toward the production of environmental-related work on the topic. Along the same line, more academic papers on the perils of not explicating the financial viability of any sustainability mandate or agenda will be a good development that can further lend credibility to the topic in the eyes of SCM professionals and corporate leaders. For example, the area of strategic SSCM aimed at making SSCM a tool for enhancing performance does not seem to have been sufficiently or directly explored by academia or business, and will be a worthy topic of further research. For instance, can SSCM contribute to the firm's operational, financial, and reputational performance? Answering the question on the ability of SSCM to contribute to the firm's performance is the primary focus of this study.

Chapter 3 Research Methodology

Introduction

The literature review indicated that there is ample theoretical foundation to justify a sustainability approach to SCM based on business management trends and ethical principles. However, the literature did not clearly justify a sustainability approach to SCM based on its contribution to performance. Empirical evidence of SSCM's contribution to firm performance may help SCM professionals make the business case for the adoption of SSCM, and also support SSCM as a potentially valid tool for policy makers addressing social and environmental issues.

Wal-Mart, Hewlett Packard, and Ford, are examples of organizations that have adopted SSCM as part of a strategy to enhance performance. But SSCM is often viewed as an aspect of corporate responsibility and seldom as a performance enhancer. This is driven in part by the lack of solid evidence linking SSCM practices with performance. Leveraging the theoretical foundations shown in the literature review, this study aimed to assess the relationship that exists between SSCM and firm's performance. It did so through a mixed methods research study in which both qualitative and quantitative research techniques and tools were used to analyze the relationships among environmental and social sustainability in the supply chain, and the firm's environmental, social, and economic performance. Also, this study investigated the effect of moderating variables (i.e., company size, industry collaboration, and regulatory framework) on the relationship between SSCM and performance.

This chapter focuses on the research methodology used in this study. It begins with a presentation of the research design, research questions, and hypotheses. The

chapter continues with a review of the selected sample, Institutional Review Board (IRB) approval, research variables, and a description of the survey instrument. Finally, the chapter discusses data collection, data analysis, and validity and reliability measures used in the study.

Research Design

This study is based on the positivist and constructionist paradigms used in social research. According to Golicic and Davis (2012), the positivist paradigm assumes that the world is external and objective, phenomena are measurable, and research should focus on facts and look for causality through quantitative methods. The constructionist paradigm makes the "philosophical assumption that knowledge is in the meanings people make of it and is gained through people talking about their meanings" (p.728). Although these paradigms have been reported to be incommensurable and incompatible, others see them as complementary (Azorin & Cameron, 2010). Proponents of this latter approach have bridged the two paradigms to create a mixed methods paradigm that leverages the benefits of both methods.

Mixed methods design was adopted as the research design for this study. "Mixed methods research is a research that combines qualitative and quantitative data collection and data analysis within a single study" (Piano Clark, 2005 cited by Azorin & Cameron, 2010, p.96). Mixed methods design was selected mainly because of the thoroughness of analysis and depth of understanding it provides (Creswell & Clark, 2006; Golicic & Davis, 2012; Venkatesh, Brown, & Bala, 2013; and Zachariadis et al 2013).

The challenges associated with mixed methods studies include the perception that they require more work, time, and financial resources (Azorin & Cameron, 2010). For

this study, the benefits outweigh these challenges: The outsider approach that guides the quantitative method is complemented by the insider approach that drives the qualitative method (Marais, 2012).

Quantitative and qualitative data were collected using a single online survey instrument designed specifically for this study. The quantitative data, collected through the first 46 questions of the survey, were first analyzed to identify relationships among the independent and dependent variables in order to make some generalizations about the relationship between SSCM and firm performance. Secondarily, moderating variables were added to the analysis to assess their impact on the relationship between the independent and dependent variables.

Qualitative data, collected through two open-ended questions at the end of the survey instrument, were analyzed using thematic analysis. The thematic analysis of the qualitative data aims at providing a deeper understanding and insights into the relationship between SSCM and firm's performance.

Collecting and analyzing qualitative and quantitative data in combination for the same study, feeds from the respective strengths of constructionism and positivism, and provides for improved results through triangulation and deeper understanding of the phenomena under study. For this study of SSCM's contribution to performance, measures of performance were captured and analyzed through quantitative and qualitative means.

Research Questions and Hypotheses

The purpose of this study was to examine the impact of SSCM on the environmental, social, and economic performance of the focal company responsible for

managing the supply chain. If SSCM is found to contribute to all three aspects of performance, SCM professionals will be equipped with a business rationale for adopting a sustainability approach to SCM based on the TBL. Environmental and social performance were measured by the contribution of SSCM to the focal company's environment related metrics and the quality of life metrics. Economic performance was measured by SSCM's impact on the firm's operational, reputational, and financial performance. The study also assessed the moderating effect of company size, industry collaboration, and the regulatory framework on SSCM's impact on the focal company's performance. The key research questions for this study are:

- Does SSCM impact environmental performance?
- Does SSCM impact social performance?
- Does SSCM impact economic performance?
- Do industry company size, industry collaboration, and the regulatory framework moderate SSCM's impact on performance?

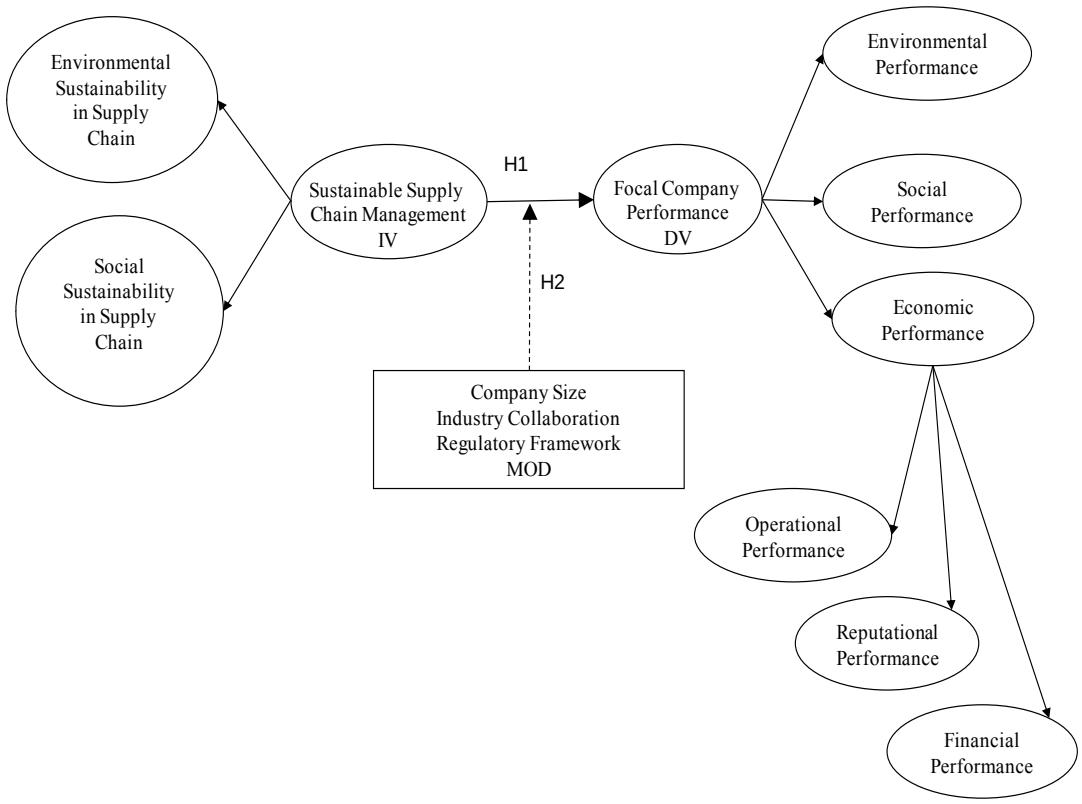

Figure 3.1 Hypothetical Model with Moderation of the SSCM and Performance Relationship.

The following hypotheses were tested to answer the research questions:

- H1: SSCM (environmental sustainability and social sustainability in the supply chain) impacts company's environmental, social, and economic performances.
    - H1a: SSCM impacts company's environmental performance.
    - H1b: SSCM impacts company's social performance.
    - H1c: SSCM impacts company's economic performance
- H2: Company size, industry collaboration, and the regulatory framework moderate the impact of SSCM on company's performance.

- H2a: Company size moderates the impact of SSCM on company's performance.
- H2b: Industry collaboration moderates the impact of SSCM on company's performance.
- H2c: Regulatory framework moderates the impact of SSCM on company's performance.

Research Variables

Environmental and social sustainability were the independent variables of the study, together they are referred to simply as SSCM. Corporate environmental, social, and economic performances were the dependent variables. Company size, industry collaboration, and regulatory framework were the moderating variables.

Independent variables. Environmental sustainability and social sustainability are the two independent variables for this study. They will be referred to collectively as SSCM.

Environmental sustainability. The environmental element of SSCM is concerned with preserving natural capital (Wong, 2013). It relates to all SSCM policies, decisions, and practices aimed at minimizing the negative impact of actions taken within the supply chain on the natural environment (Wang & Sarkis, 2013). This impact includes effects on deforestation, air quality, water quality, climate change, and resource depletion. The environmental element of SSCM is measured through compliance with standards like ISO 14001, inclusion of environmental criteria in suppliers' scorecards, and the consideration given to environmental issues in sourcing decision. Environmental sustainability in this study is measured by questions 13a, 14a, 15a, and 16a of the survey,

which respectively seek to know if the company monitors suppliers' performance, sets standards for suppliers, rewards suppliers for meeting or exceeding environmental sustainability standards, and requires suppliers to cascade its environmental sustainability standards to sub-suppliers.

Social sustainability. The social dimension of SSCM includes issues that are anthropomorphic (Wang & Sarkis, 2013). These issues impact quality of life such as working conditions, justice, and fairness for all stakeholders, and economic impact on local communities and living standards. They are measured through compliance with regulations and certifications, financial contributions to philanthropic causes, employees' involvement in local communities, and recruiting and retention of persons from socially underrepresented groups. Social sustainability in this study is measured by questions 12, 13b, 14b, 15b, and 16b of the survey which respectively seek to know if the company, encourages its suppliers to recruit from socially disadvantage groups, monitors suppliers' performance, sets standards for suppliers, rewards suppliers for meeting or exceeding social sustainability standards, and requires suppliers to cascade its social sustainability standards to sub-suppliers.

Dependent variables. Environmental performance, social performance, and economic performance are the three dependent variables of this study.

Environmental performance. Environmental performance refers to the focal company own environmental performance. In this study, it was measured by the perception of the effect of SSCM policies and practices on environmental performance (Question 18da, 19d and 22b of the survey) and third party (i.e., media or NGOs) evaluation and ranking (Question 20a/b/c/d/e/f of the survey).

Social performance. Social performance refers to the focal company own social performance. In this study it was measured by the perception of the effect of SSCM policies and practices on social performance (Questions 18e, 19e and 22a of the survey) and third party (i.e., media or NGOs) evaluation and ranking (Questions 21a/b/c/d/e/f of the survey).

Economic performance. Economic performance refers to the third leg of the TBL stool. In this study it was measured by operational, financial, and reputational performances. Economic performance was measured by questions 18 and 19 of the survey which sought to measure the impact of the company's policies and practices on environmental and social sustainability, in the supply chain on its operational, reputational and financial performances.

Operational performance. Operational performance can lead to improved product quality, on-time delivery, better speed to market, cost efficiency, and higher quality products with better residual value (Zhu et al., 2012). In the study, it was measured through question 18a and 19a.

Reputational (image) performance. Reputational performance is measured through customer satisfaction, street credit as a "good corporate citizen," and a track record of regulatory compliance (Wolf, 2014). These measures enhance customer retention, raise market barriers, and create superior brand image. In this study reputational performance was measured, through questions 18b and 19b.

Financial performance. Financial performance is measured by sales, market share, and profit (return on assets and sales). They are the direct measures of profitability

in the TBL (Wang & Sarkis, 2013). In this study financial performance was measured, through question 18c and 19c.

Moderating variables. Moderating variables were company size, industry collaboration, and regulatory framework that are thought to influence the relationship between independent and dependent variables reviewed above.

Company size. Company size was measured by annual sales, number of employees, and the company's global footprint - presence in how many countries around the world. Company size was measured through questions 5, 6, 8, 9, and 10 which assessed the number of employees, sales figure, size of the supply base, and the number of countries in which suppliers are located.

Industry collaboration structure. Industry collaboration structure was measured by the level of collaboration on SSCM issues among companies in the supply chain, often at the industry association level, to address SSCM issues through common training, audit and certification programs. Industry collaboration structure was measured, through questions 11a and 11b.

Regulatory framework. The regulatory framework refers to the level and stringency of government mandated requirements and standards that affect the company's environmental and social decisions and actions in the supply chain. These mandates could emanate from agencies like the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Security and Exchange Commission (SEC), and the National Highway Traffic Safety Administration (NHTSA) in the USA. The regulatory framework pressure was assessed, through questions 17a and 17b of the survey.

Population and Sample

The unit of analysis for this study is professionals dealing primarily with sustainability, SCM, and corporate strategy. Other participants come from related fields such as marketing and product development, who can contribute to the research. Designing for and marketing sustainability or attracting socially-responsible investors require knowledge of SSCM.

The study focused on the automotive, electronics, telecommunications, and aerospace industries to capture input from respondents who confront similar supply chain challenges (i.e., number of suppliers between the focal companies and its raw materials). Restricting the survey to NAFTA-based firms or those whose supply chains extend into NAFTA also helped identify respondents facing similar SSCM challenges. Of the 410 invitees who opened the survey link, 242 completed the survey.

Institutional Review Board (IRB)

To satisfy the requirements set forth by the Lawrence Technological University (LTU) Institutional Review Board (IRB) for conducting research with human subjects, the National Institute of Health (NIH) Office of Extramural Research web-based training course "Protecting Human Research Participants" was completed on December 15, 2013 under Certification Number: 1344833 (see Appendix A). Subsequently, the Institutional Review Board (IRB) application (Appendix B) was submitted to the LTU IRB for review and approval on March 28, 2014. The application also included a Survey Informed Consent (Appendix C) and a Survey Flyer (Appendix D). The IRB approval was provided on April 17, 2014.

Research Instrument

For this mixed methods study, the research instrument was a survey used to collect quantitative and qualitative data. The survey consisted of 48 questions: nine direct, 37 Likert-scale, and two open-ended.

An online survey instrument was developed in Survey Monkey to collect the raw data needed for this study. A draft of the survey was submitted with the IRB application. To lessen the "emotional or affective content" (Fowler, 1995, p.65) of the following phrases in the survey: "strongly agree", "agree", "somewhat agree", "disagree" and "strongly disagree" they were replaced by more neutral descriptions of agreement like "great extent", "considerable extent", "moderate extent", "some extent" and "not at all" respectively. Input from committee members led to better alignment of the questionnaire with the research purpose and key research questions; elimination of questions that had low relevance to the research; and a question added to capture the geographic location of the companies, and their association with NAFTA.

Subsequent drafts of the survey were reviewed with the Dissertation Committee for reliability and validity. As reported in Table 3.1 the final survey instrument (Appendix E) consisted of 48 questions organized to collect data for the following categories: demographics, environmental sustainability in the supply chain, social sustainability in the supply chain, environmental performance, social performance, economic performance, moderators, and open-ended questions.

Table 3.1 *Survey Questions by Categories.*

Categories	Survey Questions	Number of Questions
Demographics of companies	2, 3,4 and 7	4
Environmental sustainability in the supply chain	13a, 14a, 15a, and 16a	4
Social sustainability in the supply chain	12, 13b, 14b, 15b, and 16b	5
Environmental performance	18d, 19d, 20a, 20b, 20c, 20d, 20e, 20f and 22b	9
Social performance	18e, 19e, 21a, 21b, 21c, 21d, 21e, 21f and 22a	9
Economic Performance		6
- Operational performance	18a and 19a	
- Reputational performance	18b and 19b	
- Financial performance	18c and 19c	
Moderators		9
- Company size	5, 6, 8, 9, and 10	
- Industry collaboration	11a and 11b	
- Regulatory framework	17a and 17b	
Open-ended Questions	23 and 24	2

The two open-ended questions gathered respondents' perceptions of the benefits, challenges and solutions to environmental and social sustainability.

Pilot Study

Following the review and approval of the survey by the dissertation committee, a pilot survey with 14 participants was conducted to test and improve the survey instrument before its full deployment. Pilot survey participants included known professionals who have dealt with SSCM issues in different capacities. Data for the pilot study were collected through Survey Monkey between July 23, 2014 and July 30, 2014. Pilot respondents were asked to complete the survey and provide feedback in the form of overall comments and suggestions about the survey, in order to help address the following:

- Length of survey
- Clarity of instructions
- Unclear or ambiguous questions
- Questions the respondents felt uneasy about answering
- Survey layout and attractiveness
- Any other comments (Saunders, Lewis & Thornhill, 2007, p.394).

Six of the 14 pilot participants provided comments and suggestions, which were accounted for in the final survey.

Data Collection Procedure

Following the completion of the pilot survey, the full survey was administered to the target population through Survey Monkey. E-mail and weblink invitations were sent to prospective participants. The invitation letter included the Informed Consent, an explanation of the purpose of the research, and a link to the survey.

First invitations were sent on September 03, 2014, and the survey remained available until January 03, 2015. To encourage participation, additional invitations and reminders were sent monthly between the survey kickoff and the close out dates of January 03, 2015. Survey data were downloaded from the Survey Monkey website and stored on the researcher's personal computer with password protection.

Data Analysis

The data analysis consisted of the quantitative, qualitative and the mixed-methods analyses. The final data set included the 14 responses from the pilot survey.

Quantitative analysis. The quantitative data analysis for this study was comprised of descriptive and inferential statistics. Descriptive statistics served to organize, describe, and present the data collected from respondents. They provided simple summaries about the sample and the measures through univariate analysis showing frequency graphs, means, and standard deviations of the data. Minitab 17 and Microsoft Excel 2010 were the two software packages used to conduct the quantitative analysis.

Inferential statistics in Minitab 17 were used to test hypotheses by determining the ability of the independent variables to predict the dependent variables, and the effects of the moderating variables on the relationship between independent and dependent variables. This was performed through simple regression and hierarchical multiple regression analysis. Statistical significance was determined through p-values $< .05$.

Qualitative analysis. The qualitative data collected for this study were analyzed using thematic analysis. According to Boyatzis (1998):

> Thematic analysis is a process used with qualitative information. A theme is a pattern found in the information that at a minimum describes and organizes the possible observations and at a maximum interprets aspects of the phenomenon. A theme may be identified at the manifest level (directly observable in the information) or at the latent level (underlying the phenomenon). Themes may be initially generated inductively from the raw information or generated deductively from theory and prior research. . . Thematic analysis has a number of overlapping or alternate purposes. It can be used as
>
> 1. A way of seeing
> 2. Away of making sense out of seemingly unrelated material
> 3. A way of analyzing qualitative information
> 4. A way of systematically observing a person, an interaction, a group, a situation, an organization, or a culture
> 5. A way of converting qualitative information into quantitative data. (pp. 4-5)

The two open-ended questions helped explore the thoughts and inclinations of the respondents. They were analyzed using items 3 and 5 of the thematic analysis framework referenced above. The review of all responses led to the identification of emerging ideas that were grouped into themes. The count of occurrences for each theme served as the basis for creating a histogram of the benefits, challenges, and solutions to environmental and social sustainability.

Meta-inference (combined quantitative and qualitative analysis). Meta-inferences or triangulations are defined by Venkatech, Brown and Bala (2013) “as

theoretical statements, narratives, or a story inferred from an integration of findings from quantitative and qualitative strands of mixed methods research" (p.18). Meta-inference seeks to integrate quantitative and qualitative analyses into one single analysis to offer a holistic and deeper analysis of the phenomenon of interest. Mixing quantitative and qualitative data can be achieved by merging, connecting or embedding both set of data (Ewing, 2013). Meta-inference in this study contrasted findings from quantitative and qualitative analyses to discern any association. Thus triangulation in the mixed methods context "played a key role in identifying generative mechanisms (revealing why things are as they appear) and forming robust meta-inferences" (Zachariadis, Scott, & Barrett p.875).

Validity and Reliability

The quality of the research design was assured through measures taken to enhance its validity and reliability. Construct validity is established if several questions measuring the same or closely related variables are highly correlated with one another (Fowler, 1995). It was measured through the intercorrelations among the study's variables and the average variance extracted (AVE).

Content validity was demonstrated by asking the dissertation committee to review the face validity of the survey items and by conducting a pilot survey. The pilot survey was conducted with SSCM professionals, considered to be subject matter experts, in companies across the key industries in the study. Caution was taken to include respondents from both OEM and non-OEM companies in the pilot survey. These professionals were asked to complete the survey and provide feedback on the representativeness, suitability, and structure of the survey questions (Saunders, Lewis &

Thornhill, 2007). Their feedback was incorporated and the survey instrument modified slightly.

Reliability or internal consistency of the measures used in the survey instrument was assessed through Cronbach's (1951) Alpha coefficient. Cronbach's Alpha is commonly used as an estimate of the reliability of a psychometric test for a sample of examinees. For this study, the different measures in the survey had Cronbach's alpha ranging from 0.81 to 0.96, which meant good or excellent reliability (George and Mallery, 2003).

Summary

Chapter Three outlined the methodology used for this research. The chapter first showed a detailed presentation of the research design, research questions and hypotheses tested. Next, an overview of the population sampled, unit of analysis, and survey instrument including the IRB process and the pilot survey were given. Finally, the data collection tools and process, data analysis methodologies, and the tests for validity and reliability were reviewed. Chapter Four presents the results of the research.

Chapter 4 Results

Introduction

This chapter provides a detailed description of the analysis and findings. It begins with an overview of the findings and the sample. Next, the psychometric properties (internal consistency reliability measured by Cronbach's alpha, and construct validity measured by average variance extracted—AVE) of the constructs are presented, followed by a review of the intercorrelations among the study variables. Descriptive statistics for the independent, dependent, and moderating variables are presented. This is followed by the results of the hypotheses tests. Significance was evaluated at the 95% confidence level for all inferential statistics. Finally, a thematic analysis of the qualitative questions is presented. The chapter concludes with a summary of the findings, including a triangulation of the quantitative and qualitative analyses.

Overview of the Findings

This study investigated the impact of sustainable supply chain management (SSCM) on corporate performance. It determined through regression analysis that the two elements of SSCM (i.e., environmental sustainability and social sustainability) had positive effects on corporate environmental, social, and economic performance. The study also determined, through regression analysis and factorial plotting, that the regulatory framework was a strong moderator of the impacts of SSCM on corporate performance whereas the moderating effect of company size and industry collaboration was marginal.

Overview of the Sample

Respondents were requested to provide their perceptions of their company's actions to address environmental and social sustainability issues throughout their supply chains, and the effects (if any) of these actions on the environmental, social, and economic performance of their company. A total of 242 respondents answered over 80% of the quantitative questions. The number of responses to individual quantitative questions varied from 195 (Question 21) to 242 (Questions 2 and 5). The two qualitative questions had lower response counts (88 and 78 respectively) than any of the quantitative questions.

Respondents were from the Automotive, Electronics, Telecommunications, and Aerospace industries (Figure 4.1). These are global manufacturing industries that are likely to face similar sustainability challenges managing their supply chains as products move from one country to another. As shown in Figure 4.1, nearly 60% of the responses were from the automotive industry.

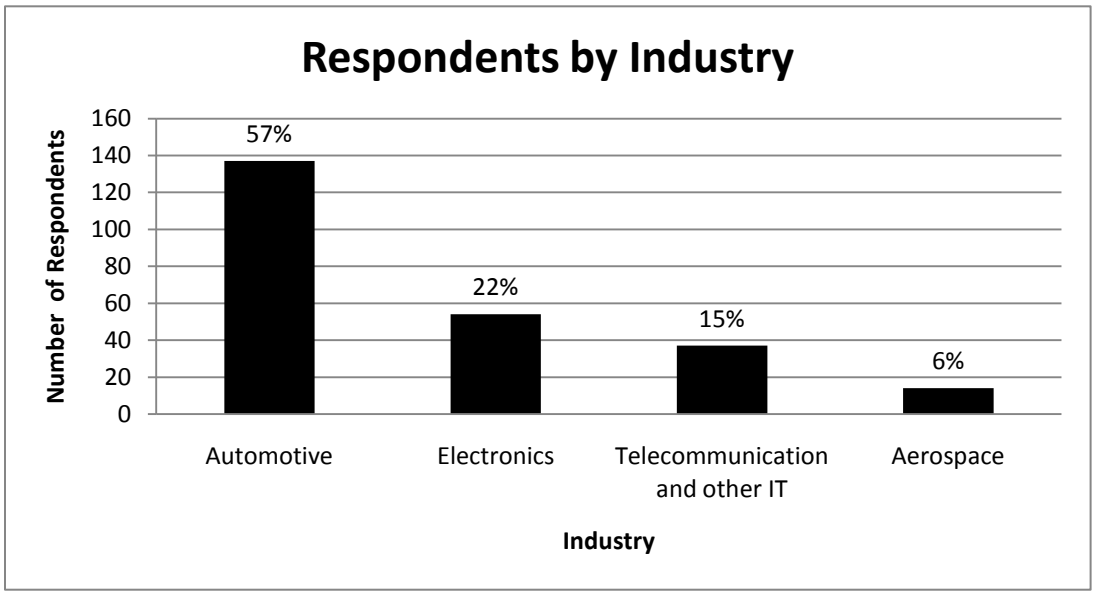

Figure 4.1 Respondents by Industries.

Figure 4.2, shows that 45% of the respondents reported to work in either sustainability (16%) or SCM (29%). Professionals from Finance, Legal, Marketing, and Engineering accounted for 41% of the responses. The remaining responses came from professionals in Human Resources, Information Technology, and Program Management grouped under the category "Other". With over four-fifths of respondents working directly in SSCM fields or fields likely to be affected by SSCM, the data provide a broad and diversified range of perceptions of the impact of SSCM on corporate performance.

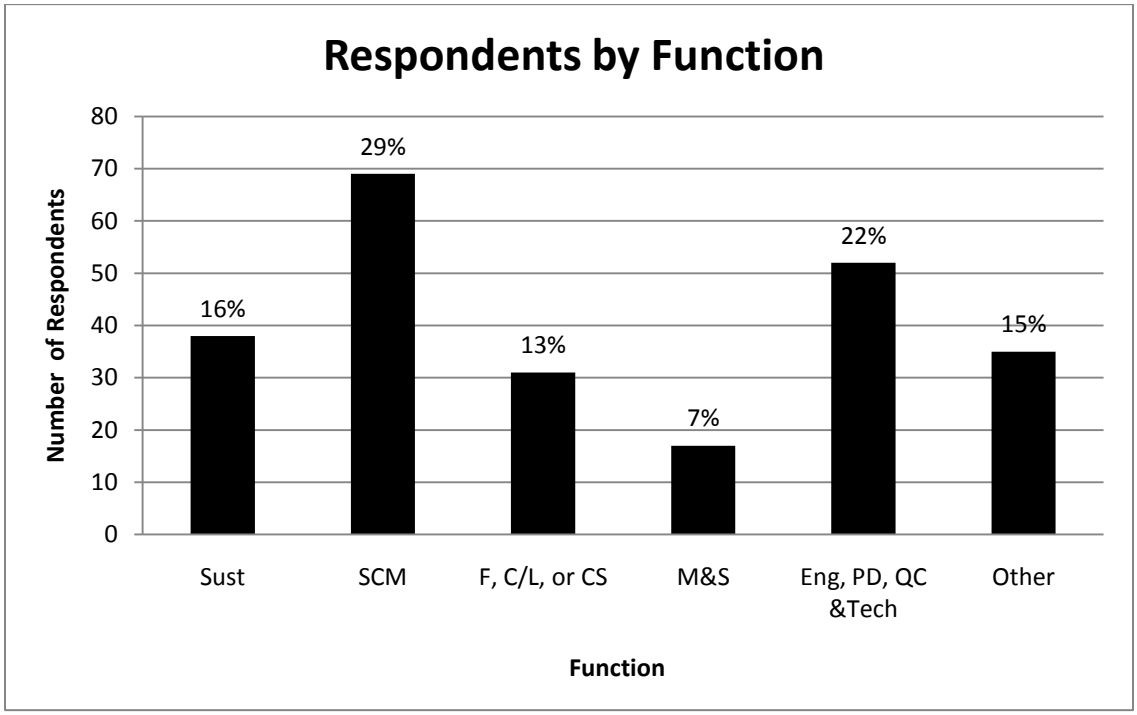

Figure 4.2 Respondents by Function.

Note. N = 242; Sust = Sustainability; SCM = Supply Chain management; F, C/L, or CS = Finance, Compliance/Legal or Corporate Strategy; Eng, PD, QC, & Tech = Engineering, Product Development, Quality Control, and other Technical; Other (Human Resources, Information Technology, Program Management).

Characteristics of firms. More than half of the companies were privately owned (53%) whereas about 40% were publicly traded (Figure 4.3). The remaining companies

had a mixed ownership structure such as public-private partnership. Again, this provides a diversity of perceptions of the impacts of SSCM on company performance.

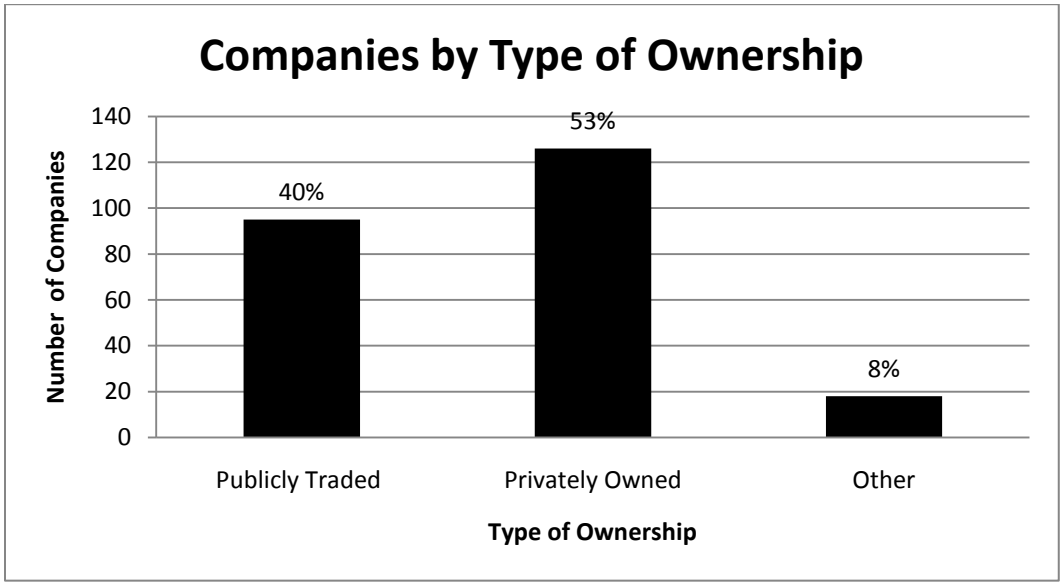

Figure 4.3 Companies by Type of Ownership.

Also, 91% of the companies represented in the survey had supply chains that extended into NAFTA (see Table 4. 1). This provides a consistent regulatory framework within which to assess SSCM because NAFTA member-countries attempt to harmonize their regulatory frameworks.

Table 4.1 *Supply Chain Location.*

	N	%
NAFTA	220	91
Non-NAFTA	22	9
	242	100

Respondents were asked to provide the number of people employed by their companies (Figure 4.4) and the company's worldwide sales (Figure 4.5). Over 50% (123) reported that their company had 10,000 employees or more in 2013; about 50% (116) had worldwide sales of five billion US dollars or more in 2013. Thus, most of the data were obtained from respondents employed with large organizations that are likely to devote more resources to initiatives like SSCM because of greater NGOs and media scrutiny of their policies and actions.

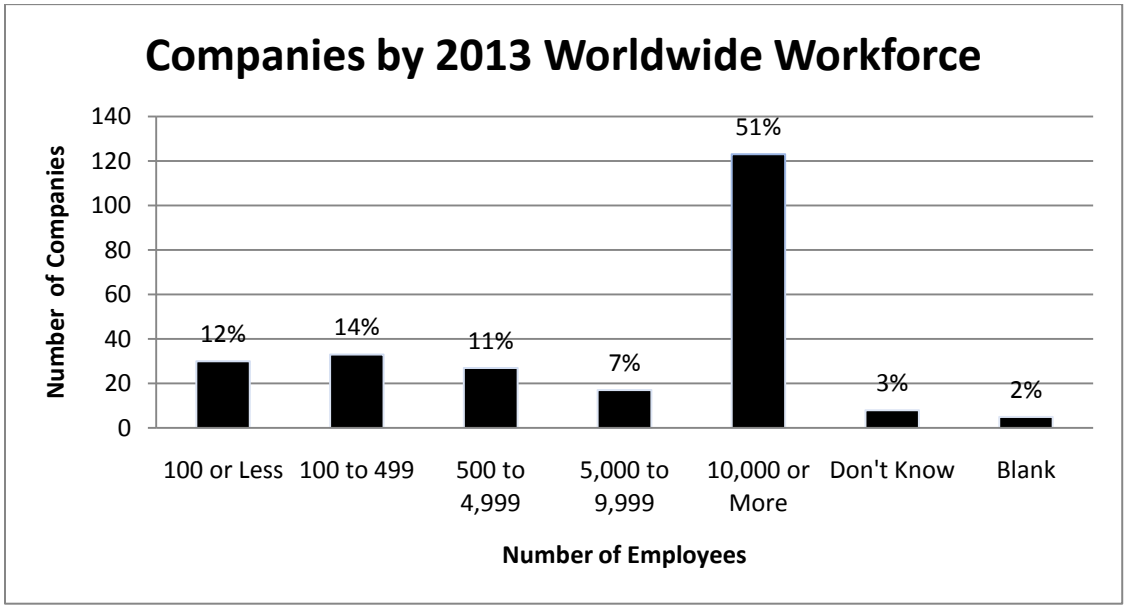

Figure 4.4 Companies by 2013 Workforce.

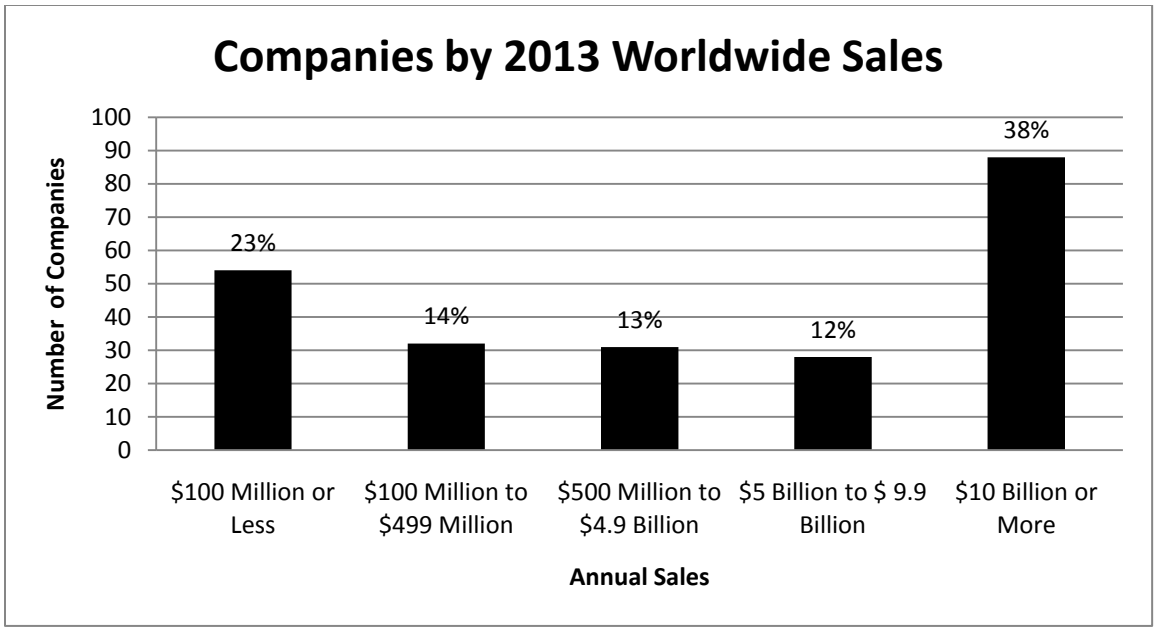

Figure 4.5 Companies by 2013 Worldwide Sales.

The geographical dispersion of suppliers to these companies, and the complexity of their supply chains were evaluated through the number of suppliers, the number of countries in which suppliers were located, and the number of intermediate suppliers reported. About 42% (97) of the companies had over 1,000 suppliers, and close to 60% had over 250 suppliers in 2013 (Figure 4.6). The large number of suppliers suggests that these companies face significant challenges coordinating the implementation of SSCM among multiple suppliers who may not share the focal company's commitment to SSCM.

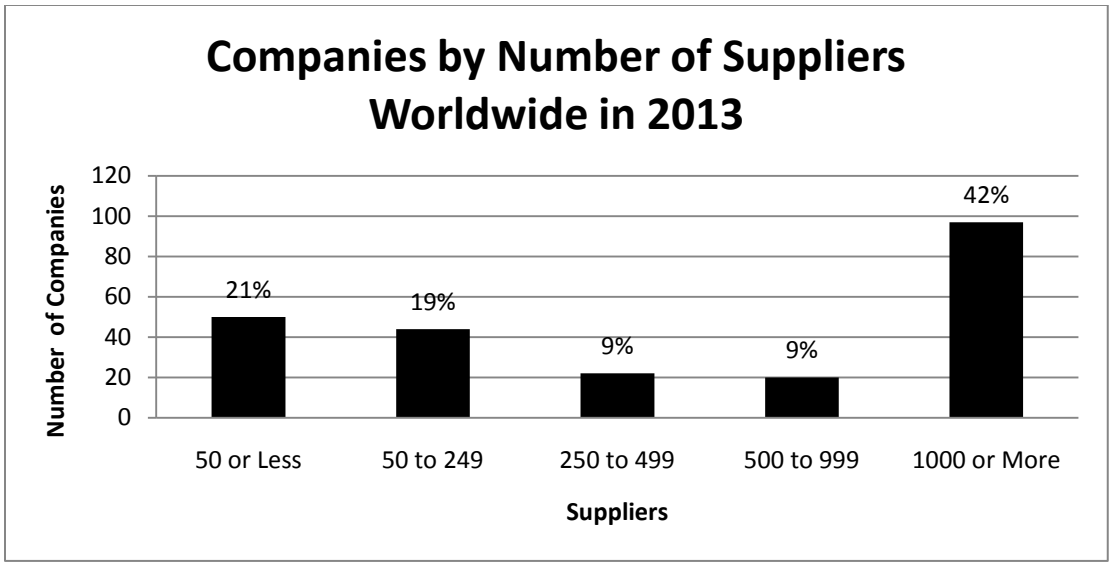

Figure 4.6 Companies by Number of Suppliers in 2013

Figure 4.7 shows that almost 62% (145) of the companies had suppliers located in ten or more countries. This suggests that most of the companies in this study have global supply chains, further adding to the complexity of coordinating SSCM across national boundaries.

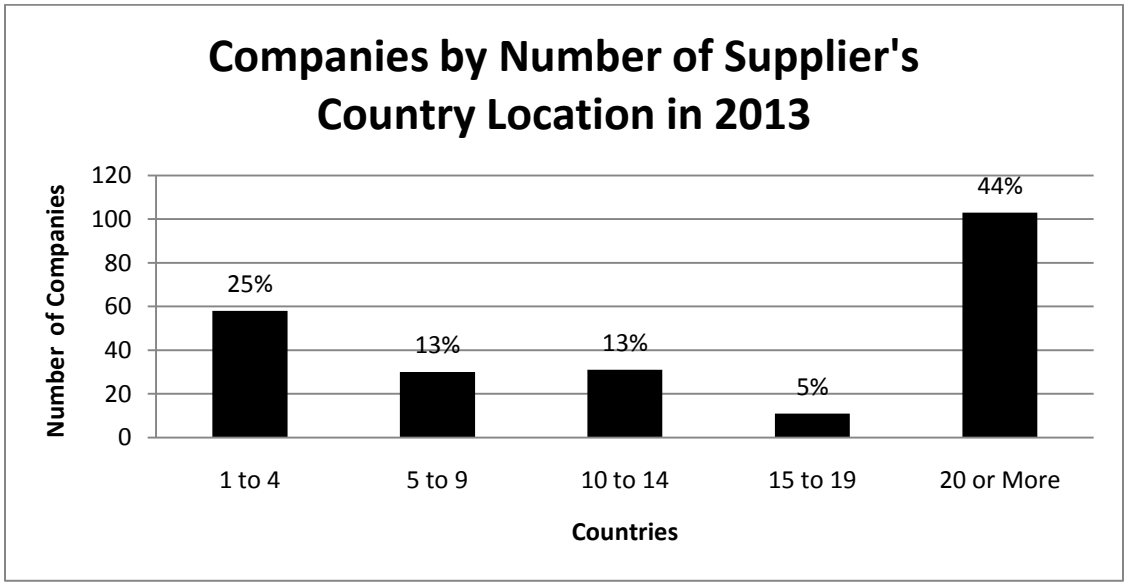

Figure 4.7 Companies by Number of Countries Where Suppliers are Located.

The complexity of the supply chain was also assessed by the supply chain's longest logistical distance (LLD), measured by the number of intermediate suppliers between the company and its raw material source. Forty-one percent of the respondents did not know their company's LLD (Figure 4.8). Of the 140 who reported that there were at least 4 intermediate suppliers between their company and its raw material source, 27% reported a LLD of 10 or more. This creates additional complexity in managing supply chains because the higher the LLD, the harder it is for the focal company to fully engage its supply chains on SSCM issues. It is easier for a company to engage its tier one suppliers, with which it has contracts, than to engage tier two suppliers with which it does not have contracts.

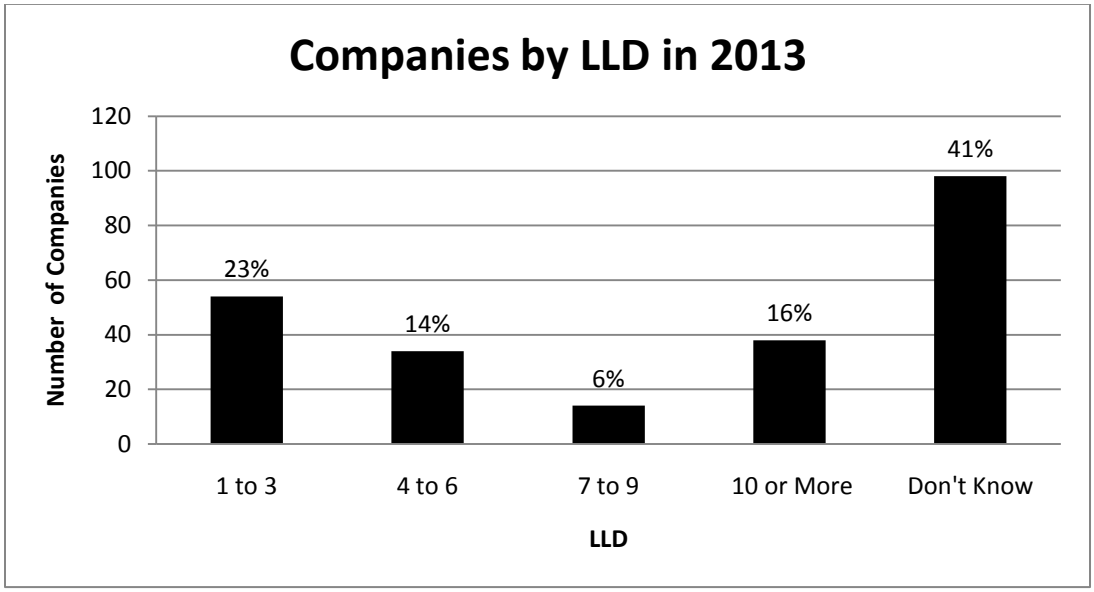

Figure 4.8 Companies by LLD in 2013.

The survey also asked respondents to indicate if their company issued an annual report on environmental sustainability and/or social sustainability. The results in Figure 4.9 show that almost 58% of respondents indicated that their company issued an annual report for environmental sustainability and/or social sustainability. Of those that issued

sustainability reports, 87% issued them for environmental and social sustainability. This suggests that companies were thought to view environmental and social sustainability as key components of sustainability.

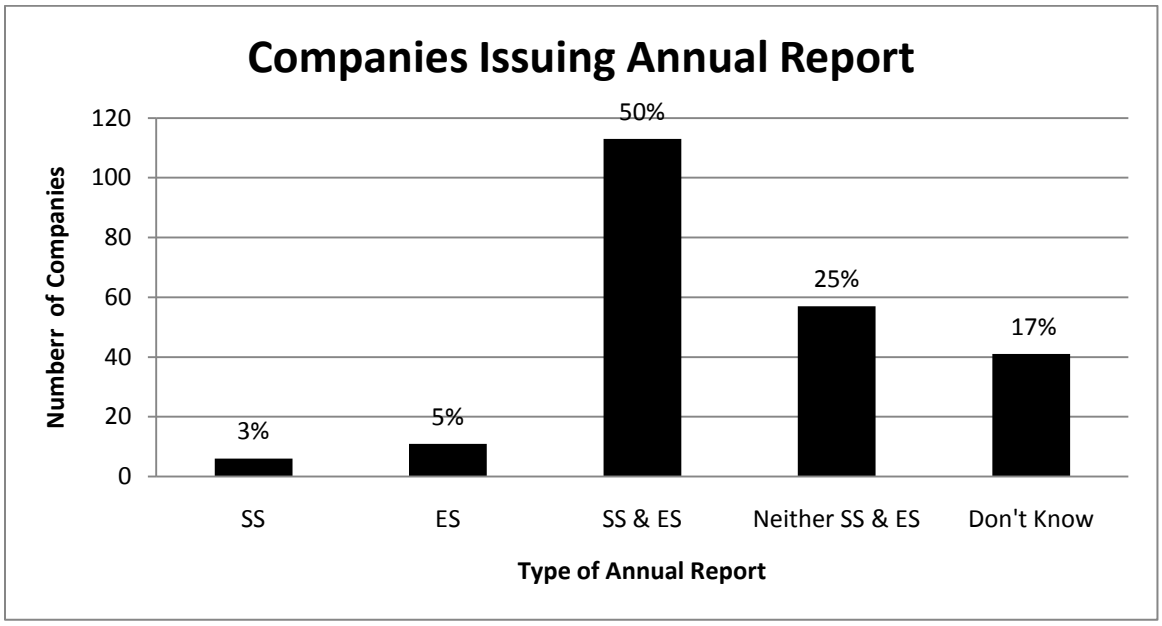

Figure 4.9 Company Issuance of Sustainability Report.
Note. SS = Social Sustainability; ES = Environmental Sustainability

Reliability and Validity

Reliability and validity. Reliability for this study was evaluated in Minitab 17 via Cronbach's alpha test of internal consistency reliability (Cronbach, 1951). As shown in Tables 4.2 and 4.3, all alpha values for the study's constructs, dimensions, and factors were greater than the recommended criterion level of .70 (Hinkin, 1998).

Table 4.2 *Reliabity of the 13 Items Measuring Sustaianable Supply Chain Management* (SSCM)

SSCM Items	Mean[1]	SD[2]	Alpha[3]	AVE[4]
SSCM (13-items)	3.28	1.06	.953	
Environmental Sustainability (6 items)	3.24	1.13	.911	.663
Extent of collaboration to address ES	3.61	1.33		
Extent of monitoring suppliers' perfo. for ES	3.31	1.32		
Extent of setting standards for ES	3.25	1.41		
Extent of rewarding suppliers for ES	2.45	1.30		
Extent of requiring cascading of ES Standards	2.86	1.34		
Extent of legal/regulatory influence on ES	3.88	1.26		
Social Sustainability (7 items)	3.31	1.07	.914	.618
Extent of collaboration to address SS	3.61	1.32		
Extent of monitoring suppliers' perfo. for SS	3.30	1.33		
Extent of setting standards on SS	3.34	1.35		
Extent of rewarding suppliers for social perfo.	2.48	1.30		
Extent of requiring cascading of SS standards	2.92	1.38		
Extent of legal/regulatory influence on SS	3.80	1.24		
Extent of recruiting from disadvantaged groups	3.61	1.33		

Note. Psychometric properties conducted on data from N = 242 study participants; SSCM = Sustainable Supply Chain management; Perfo = Performance; ES = Environmental Sustainability; SS = Social Sustainability; [1]Mean of items within scale where each item is measured on a 5-point Likert scale; 1 = not at all, 2 = Some Extent, 3 = Moderate Extent, 4 = Considerable Extent, 5 = Great Extent. [2]Standard deviation. [3]Cronbach's alpha reliability measure of internal consistency. [4]Average variance extracted (AVE).

Table 4.3 *Reliability of Items Measuring Firm Performance.*

Company Performance Items	Mean[1]	SD[2]	Alpha[3]	AVE[4]
Firm Performance (10-items)	3.21	1.10	.96	
Environmental Performance	3.25	1.24	.85	.735
Extent of influence by SC ES policy/practice	3.35	1.30		
Extent of influence by SC SS policy/practice	3.16	1.34		
Social Performance	3.27	1.18	.87	.765
Extent of influence by SC ES policy/practice	3.20	1.27		
Extent of influence by SC SS policy/practice	3.35	1.24		
Economic Performance	3.18	1.12	.93	
Operational Performance	3.00	1.26	.88	.780
Extent of influence by SC ES policy/practice	3.06	1.33		
Extent of influence by SC SS policy/practice	2.96	1.34		
Reputational Performance	3.51	1.12	.81	.657
Extent of influence by SC ES policy/practice	3.54	1.21		
Extent of influence by SC SS policy/practice	3.48	1.23		
Financial Performance	3.02	1.24	.89	.792
Extent of influence by SC ES policy/practice	3.06	1.30		
Extent of influence by SC SS policy/practice	3.00	1.30		

Note. Psychometric properties conducted on Performance data from N = 242 study participants; SC = Supply Chain; ES = Environmental Sustainability; SS = Social Sustainability; [1]Mean of items within scale where each item is measured on a 5-point Likert scale; 1 = not at all, 2 = Some Extent, 3 = Moderate Extent, 4 = Considerable Extent, 5 = Great Extent. [2]Standard deviation. [3]Cronbach's alpha reliability measure of internal consistency. [4]Average variance extracted (AVE).

In Table 4.2 the SSCM construct has an alpha score of .953 suggesting excellent reliability. The environmental sustainability and social sustainability dimensions of SSCM had alpha scores of .911 and .914 respectively also indicating excellent reliability. In Table 4.3 the performance construct is reported as having an alpha score of .96; this is higher than the alpha scores for the three dimensions of performance: environmental performance (.85), social performance (.87) and economic performance (.93); based on alpha scores only the economic performance dimension had excellent reliability whereas the other two showed good reliability. The three factors of economic performance i.e., operational, financial, and reputational performance had good reliability with alpha

scores of .88, .81, and .89 respectively. These results suggest the data for this study were obtained from a reliable questionnaire.

Validity was evaluated through both content and construct validity. Content validity (Fowler, 1995) was evaluated by asking the dissertation committee to check the face validity of the questionnaire and by conducting a pilot survey with 14 professionals. These professionals were asked to complete the survey and to provide feedback on the representativeness, suitability, and structure of the survey questions (Saunders, Lewis, & Thornhill; 2007). Feedback from the dissertation committee and pilot study participants indicated that questionnaire items were easy to understand, and face validity appeared to be met. However the following changes were made to the final questionnaire:

1. Questions were better aligned with the different constructs of the study, and redundant questions were removed.
2. The list of third party ranking organizations in questions 20 and 21 were enlarged to include Corporate Responsibility Officer (CRO), Ethisphere, and FTSE 4 Good
3. Likert-scale questions (11 through 22) were re-written to address environmental and social sustainability theme under the same theme
4. Likert-scale labels were re-written to lessen their emotional content, i.e., Completely Agree became Great Extent.

Content validity was confirmed by creating questionnaire items that were adopted from the existing literature.

Construct validity was evaluated by assessing the convergent validity of the two scales for SSCM and performance in the questionnaire via the average variance extracted

(AVE). AVE is an index of convergent validity and its value should be greater than .50 (Chin, Gopal, & Salisbury, 1997; McLure, Wasko & Faraj, 2005; Wixom & Watson, 2001). AVEs for the two study scales were calculated from the factor loadings obtained from a confirmatory factor analysis run in M*plus* 7.3 and are presented in Tables 4.2 and 4.3. As shown, AVEs for the study were greater than .50 suggesting that the questionnaire was valid.

Descriptive Statistics

This section presents the results of the descriptive statistical analysis for the measures of the independent, dependent and moderating variables. It begins with the presentation of the intercorrelations among the study's variables. The analysis was based on frequency distributions, means and standard deviations.

Intercorrelations among study variables. Intercorrelations among the study variables were assessed by a 6-item measure of environmental performance, a 7-item measure of social performance, and a 10-item measure of performance. As presented in Table 4.4 the intercorrelations of these variables (and their constitutive elements) showed statistically significant, positive correlations among the study's variables.

All correlations presented in Table 4.4 were significant at p less than .01. The strength of the correlation was assessed through the value of the correlation coefficient, which ranges from -1 to 1. In this study, given that the correlations were all positive, the range was from 0 to 1. A coefficient of 0 indicates no correlation, a coefficient of .3 indicates low correlation, a coefficient of .5 indicates medium correlation, and a coefficient of .7 or more indicates a high correlation.

Table 4.4 *Intercorrelations Between Study Variables.*

Var	Mean (SD)	ES	SS	SSCM	EnP	SoP	EcP	OpP	ReP	FiP
ES	3.23 (1.12)									
SS	3.30 (1.07)	.87								
SSCM	3.27 (1.06)	.96	.97							
EnP	3.24 (1.23)	.78	.76	.80						
SoP	3.26 (1.18)	.74	.79	.79	.90					
EcP	3.18 (1.11)	.74	.72	.76	.84	.79				
OpP	3.00 (1.26)	.66	.62	.66	.72	.66	.94			
ReP	3.50 (1.11)	.76	.75	.78	.85	.85	.89	.70		
FiP	3.01 (1.24)	.64	.62	.66	.75	.70	.93	.84	.74	
PE	3.21 (1.09)	.79	.78	.81	.93	.90	.97	.88	.92	.89

Note. ES = Environmental Sustainability; SS = Social Sustainability; SSCM = Sustainable Supply Chain Management; EnP = Environmental Performance; SoP = Social Performance; EcP = Economic Performance; OpP = Operational Performance; ReP = Reputational Performance; FiP = Financial Performance; PE = Performance; Correlation presented in the table are significant at $P < .001$.

Essentially all correlation coefficients reported were high, 38 of the coefficients were greater than .70 and the remaining seven coefficients ranged from .628 to .668. For example, the correlation between environmental sustainability and performance was .79 suggesting that an increase in environmental sustainability is correlated with an increase in performance; and a decrease in environmental sustainability will be correlated with a proportional decrease in performance.

Independent variables. Environmental and social sustainability policies and practices in the supply chain were assessed by the responses to questions 11 through 17 of the survey. Table 4.5 indicates that 62% of the respondents thought that their company encouraged their suppliers to recruit persons from socially under-privileged groups from a moderate to a great extent, and one in five thought their company made no effort to encourage recruiting from these groups.

Table 4.5 *Level of Company Encouraging Suppliers to Recruit from Socially Under-privileged Groups.*

Level of Encouragement	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
	40	18	50	22	51	22	39	17	48	21	228	3.6	1.33

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Table 4.6 indicates that over 72% of the respondents thought that their company monitored suppliers' performance on environmental sustainability, and 70% on social sustainability respectively, from a moderate to a great extent. In both cases, 13 and 12% did not monitor suppliers' environmental and social performance. This is an indication that although it is thought that most companies assign some value to their suppliers' performance on SSCM issues through monitoring, a sizable proportion of respondents believed that these companies did not monitor suppliers' performance.

Table 4.6 *Level of Company Monitoring of Suppliers' Performance.*

Level of Monitoring for:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Environmental Sustainability	51	22	67	29	47	21	35	15	30	13	230	3.30	1.32
Social Sustainability	55	24	58	25	47	21	41	18	27	12	228	3.30	1.32

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Table 4.7 indicates that over 68% of the respondents thought their company set standards for suppliers on environmental sustainability, and over 71% on social sustainability from a moderate to a great extent. About one-sixth reported not setting standards for suppliers. Here again the value given to SSCM in the supply chain is

expressed through the high proportion of companies that reported setting standards, and the relatively smaller proportion not setting standards.

However, it is worth noting that the proportion of respondents who believed that their companies did not set standards (17%) was bigger than the proportion of those who believed their company did not monitor performance (13%). This means respondents thought that more companies are interested in knowing how their suppliers perform on SSCM than they are in knowing if suppliers set standards for performance measures.

Table 4.7 *Level of Company Setting Standards in the Supply Chain.*

Level of Standards Setting for:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Environmental Sustainability	56	25	59	26	40	17	35	15	38	17	228	3.24	1.41
Social Sustainability	56	24	66	29	41	18	37	16	30	13	230	3.33	1.34

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Table 4.8 indicates that 60% of respondents thought that their company required suppliers to cascade standards for environmental sustainability down the supply chain from a moderate to a great extent and 61% for social sustainability. Over one-fifth reported that their company did not require that SSCM standards be cascaded throughout the supply chain. The proportions of respondents who believed their companies did not require that standards be cascaded (22% and 23%) are higher than the proportions of those who believed their companies did not set standards (17% and 13%). This indicates that some companies that are setting standards do not to take the next step to encourage

their propagation throughout the supply chain. This is a lost opportunity to engage the supply chain on SSCM beyond tier 1 suppliers.

Table 4.8 *Level of Company Requiring Suppliers to Cascade Standards.*

Level of Cascading Standards for:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Environmental Sustainability	27	12	61	27	47	21	42	18	51	22	228	2.85	1.34
Social Sustainability	33	14	59	26	49	21	36	16	52	23	229	2.92	1.37

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Table 4.9 indicates that 48% and 49% of respondents thought that their company rewarded suppliers for environmental and social sustainability performance, from a moderate to a great extent. Thirty-five percent and 33% thought their companies did not reward suppliers for environmental and social performance. Thus, respondents believed that companies are less inclined to provide incentives for SSCM performance than they are to monitor performance, set standards or require that standards be cascaded through the supply chain.

Table 4.9 *Level of Company Rewarding Suppliers.*

Level of Rewarding for:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Environmental Sustainability	11	5	47	21	49	22	38	17	77	35	222	2.45	1.29
Social Sustainability	8	4	60	27	40	18	40	18	75	33	223	2.48	1.29

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

In summary, results of the frequency analysis suggest that with the exception of rewarding suppliers for environmental and social sustainability performance, for which less than 50% of respondents thought that their company did this from a moderate to a great extent, at least 59% of respondents reported a moderate to great extent rating for encouraging recruiting from socially disadvantage groups, monitoring suppliers performance, setting standards, and requiring cascading of standards. Also with the exception of rewarding suppliers, nearly 80% of respondents believed that their companies were engaged in SSCM activities at least to some extent.

The proportions of respondents who believed that their companies did not engaged in one or many SSCM activities were in the double-digits. Twenty-one percent thought their company did not encourage recruiting from socially disadvantaged groups, whereas 13% and 12% thought their company did not monitor suppliers' environmental and social performance. Likewise 17% and 13% thought their company did not set environmental and social standards for suppliers, 22% and 23% thought their company did not require that environmental and social standards be cascaded, and 35% and 33% thought their company did not reward suppliers for environmental and social performance. These results show a trend towards a belief that companies were less committed to devoting resources to SSCM, and lack alignment between their intentions and actions.

Dependent variables. The three performance variables were environmental performance, social performance, and economic performance of the focal company; economic performance consisted of operational, reputational and financial performance.

Table 4.10 summarizes the impacts of environmental sustainability policies and practices in the supply chain on all five measures of the focal company's performance. Environmental sustainability in the supply chain was reported by 63% of the respondents to have at least a moderate effect on the focal company's operational performance, 78% on reputational performance, and 65% on financial performance. Also, 15%, 7%, and 14% respectively thought that environmental sustainability in the supply chain had no effect on these measures of economic performance.

Among all measures of economic performance, reputational performance was the most impacted by environmental sustainability. It had the highest rating (78%) for being impacted at least to a moderate extent, and the lowest rating (7%) for not being impacted. This indicates that environmental sustainability was perceived more as a tool to enhance the reputation of the focal company than a lever for improved operational or financial performance.

Seventy-four percent of respondents were of the opinion that environmental sustainability in the supply chain contributed to environmental performance at least to a moderate extent, and 69% for social performance; 12% thought it had no effect on these two measures of performance. Interestingly again, the percentage reporting at least a moderate impact on reputational performance (78%) was higher than for environmental performance, and the percentage reporting no effect on reputational performance (7%) was lower than for environmental performance (12%). Although one might expect that environmental policies and practices in the supply chain would have a greater impact on environmental performance, these results showed a bigger contribution of environmental

sustainability in the supply chain to reputational performance. This finding will be further tested with H1.

Table 4.10 *Perception of Environmental Sustainability Contribution to Performance.*

Level of Contribution to:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Operational Performance	41	18	53	23	50	22	51	22	34	15	229	3.06	1.32
Reputational Performance	58	25	79	35	42	18	35	15	16	7	230	3.54	1.21
Financial Performance	40	18	48	21	60	26	47	21	33	14	228	3.05	1.3
Environmental Performance	50	22	72	32	45	20	33	14	28	12	228	3.34	1.3
Social Performance	42	19	62	27	53	23	44	19	26	12	227	3.2	1.26

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Table 4.11 summarizes respondents' views on the contribution of social sustainability policies and practices in the supply chain on the performance of the focal company. Social sustainability in the supply chain was reported to have at least a moderate effect on the focal company's economic performance by 60% of respondents for operational performance, 76% for reputational performance, and 62% for financial performance. Also 17%, 8%, and 16% respectively thought that social sustainability in the supply chain had no effect on these measures of economic performance. Among all three measures of economic performance, reputational performance was reported as receiving the most contribution from social sustainability. It had the highest rating (76%) for being impacted at least to a moderate extent, and the lowest rating (8%) for not being impacted. This indicates that social sustainability is also perceived more as a tool to

enhance the reputation of the focal company than a lever for improved operational or financial performance.

Sixty-seven percent of respondents were of the opinion that social sustainability contributed to environmental performance at least to a moderate extent, and 74% for social performance; 15% and 10% thought it had no effect on these measures of performance. Interestingly, the percentage of respondents reporting at least a moderate impact on reputational performance (76%) was higher than for social performance (74%), and the percentage of respondents reporting no effect on reputational performance (8%) was lower than for social performance (10%). Once again, although one might expect that social policies and practices in the supply chain would have a greater impact on social performance, this finding that the impact on reputational performance was greater further underscores the fact that, like in the case of environmental sustainability in the supply chain and environmental performance reviewed above, social sustainability is more relevant to reputational performance than it is to social performance. This will be further reviewed with H1.

In summary, both environmental and social sustainability in the supply chain were perceived as having their biggest contributions on company's reputational performance. In aggregate, these results suggest that the contribution of SSCM to economic performance was comparable to its contribution to environmental and social performance.

Table 4.11 *Perception of Social Sustainability's Contribution to Performance.*

Level of Contribution to:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Operational Performance	37	17	49	22	48	21	52	23	39	17	225	2.95	1.34
Reputational Performance	52	23	80	35	41	18	35	16	19	8	227	3.47	1.23
Financial Performance	34	15	54	24	52	23	49	22	36	16	225	3.00	1.30
Environmental Performance	43	19	65	29	43	19	41	18	35	15	227	3.16	1.34
Social Performance	45	20	74	33	47	21	38	16	22	10	226	3.34	1.24

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Respondents were also asked to assess the contribution of SSCM to their company's ranking by five organizations that publish reports on corporate environmental sustainability performance. Table 4.12 indicates that the majority of respondents thought their company's environmental performance had either a low or no impact on its ranking.

The highest ratings (51% or more) for contribution from a moderate to a great extent and the lowest ratings (38% or less) for no contribution of environmental sustainability to environmental performance were reported on the ratings by the Corporate Responsibility Office, Dow Jones Sustainability Index, and the Carbon Disclosure Project. Between 43% and 52% of respondents thought that third party rankings from any of the five listed organizations had at least a moderate effect on their company's environmental performance. However between 34% and 44% thought that these rankings had no effects. This could reflect a lack of familiarity with these rating organizations. Furthermore, when asked about the effects of rankings from other

organizations not listed, 61% thought these rankings did not affect environmental performance. This suggests that third party rankings are less relevant to environmental performance than actual environmental sustainability policies and practices in the supply chain.

Table 4.12 *Third Party Ranking of Supply Chain Environmental Sustainability Contribution to Environmental Performance.*

Level of Contribution as Measured by:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Calvert Social Index	11	6	34	19	32	18	25	14	75	43	177	2.31	1.35
Corporate Responsibility Officer (CRO)	28	15	43	23	25	14	25	14	63	34	184	2.71	1.51
Ethisphere	12	7	30	17	33	19	24	13	78	44	177	2.27	1.35
Dow Jones Sustainability Index	23	12	43	23	32	17	18	10	71	38	187	2.60	1.47
The Carbon Disclosure Project	21	11	43	23	31	17	23	12	68	37	186	2.59	1.45
Others	10	11	10	10	11	11	7	7	59	61	97	2.02	1.44

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Table 4.13 indicates that the majority of respondents thought that their company's social performance had either a low or no impact on its ranking as reported by these

organizations. This suggests a lack of alignment between actual performance and third-party rankings.

The reported highest ratings (45% or more) for contribution from at a moderate to a great extent, and the lowest ratings (40% or less) for no contribution of social sustainability to social performance were on the ratings by the Corporate Responsibility Office, Dow Jones Sustainability Index, and the FTSE 4 Good Index. Between 41% and 52% of respondents thought that third party rankings from any of the five listed organizations had at least a moderate effect on their company's social performance. However between 33% and 44% thought that these rankings had no impact on their companies' performance. This could reflect a lack of familiarity with these rating organizations. Furthermore, when asked about the impact of ranking from other organizations not listed 66% of respondents thought that those rankings did not affect their companies' social performance. This suggests that third party rankings are less relevant to social performance than actual social sustainability policies and practices in the supply chain.

Overall, third party rankings were not perceived to have much effect on either environmental or social performance. Although the rankings of the five listed organizations appeared to be better compared with those of other organizations, it remains that the percentage (between 33% and 66%) of those who reported that these rankings did not affect actual environmental or social performance is high. These results suggest that the contribution of these rankings to performance is limited.

Table 4.13 *Third Party Rating of Supply Chain Social Sustaianbility Contribution to Social Performance.*

Level of Contribution as Measured by:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Calvert Social Index	14	8	34	20	28	16	28	16	70	40	174	2.37	1.37
Corporate Responsibility Officer (CRO)	31	17	37	21	26	14	27	15	60	33	181	2.72	1.51
Ethisphere	12	7	32	18	27	16	27	15	76	44	174	2.27	1.35
Dow Jones Sustainability Index	24	13	41	22	32	18	19	10	67	37	183	2.62	1.47
FTSE 4 Good Index	12	7	36	21	30	17	26	15	68	40	172	2.39	1.36
Others	5	6	9	10	11	12	5	6	58	66	88	1.8	1.26

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Moderating variables. The effect of SSCM on corporate performance was also investigated as a function of three moderating variables: company size, industry collaboration, and regulatory framework. The proportion of respondents who perceived collaboration and regulation as affecting performance are presented in Table 4.14 and 4.15. Frequency analysis of size is not presented because respondents were asked to indicate the size of their company without linking it to performance.

Company size was measured by sales, workforce, number of suppliers, and the number of countries in which the company had suppliers. However sales as previously

reported in Figure 4.5 was selected as the best indicator of overall company size because it is a commonly used measure of size. Over 50% of respondents reported that their company had sales of more than five billion US dollars, thus providing an indication that the study for the most part dealt with large companies.

Table 4.14 indicates that 77% of respondents thought their company collaborated with peers at the industry association level, from a moderate to a great extent, to address matters of supply chain environmental sustainability – 78% for social sustainability. However 10% thought that collaboration in the industry had no effect on their company's performance. This is an indication that most companies recognize that industry collaboration could enhance the effectiveness of SSCM practices (Blome, Hollos & Foerstl, 2011). But for the 10% that reported no impact, this could reflect a lack of familiarity with the role of industry association in SSCM.

Table 4.14 *Company Collaboration at Industry Level.*

Level of Collaboration for:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Environmental Sustainability	82	35	53	23	45	19	30	13	23	10	233	3.61	1.3
Social Sustainability	79	34	54	23	48	21	27	12	23	10	231	3.60	1.3

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Table 4.15 indicates that 84% of respondents thought that regulatory requirements affected their company's actions on both supply chain environmental and social sustainability from a moderate to a great extent. Also 8% thought that regulatory requirements did not influence their companies' actions on environmental or social

sustainability. The 85% rating, the highest reported in the study, indicates that laws and regulations are thought to play a major role in influencing companies' actions on SSCM.

Table 4.15 *Legal/Regulatory Requirements' Influence on Company Actions in the Supply Chain.*

Level of Legal or Regulatory Influence on:	Great Extent		Cons. Extent		Mod. Extent		Some Extent		Not at All		Total		
	N	%	N	%	N	%	N	%	N	%	N	M	SD
Environmental Sustainability	100	43	60	26	36	15	18	8	18	8	232	3.87	1.26
Social Sustainability	89	38	64	27	44	19	18	8	18	8	233	3.79	1.24

Note. Cons. = Considerable; Mod. = Moderate; M = Mean; SD = Standard Deviation; N = number of observations; % = Proportion to Total N.

Hypotheses Testing Results

This section reviews the results of the two hypotheses tested (see Figure 4.11) to determine the effects of SSCM on performance:

- H1: SSCM (environmental sustainability and social sustainability in the supply chain) impacts company's performance.
    - H1a: SSCM impacts company's environmental performance.
    - H1b: SSCM impacts company's social performance.
    - H1c: SSCM impacts company's economic performance.
- H2: Company size, industry collaboration structure, and the regulatory framework moderate the impact of SSCM on company's performance.
    - H2a: Company size moderates the impact of SSCM on company performance.

- H2b: Industry collaboration moderates the impact of SSCM on company performance.
- H2c: Regulatory framework moderates the impact of SSCM on company performance.

The conceptual model for this study as presented in Figure 4.10 depicts the relationship between SSCM (IV), company performance (DV), and the moderators (MOD). Company size, industry collaboration and the regulatory framework are the moderators. Environmental sustainability and social sustainability are the two dimensions of SSCM. Environmental performance, social performance and economic performance are the three dimensions of performance. Operational performance, reputational performance, and financial performance are the three factors of economic performance.

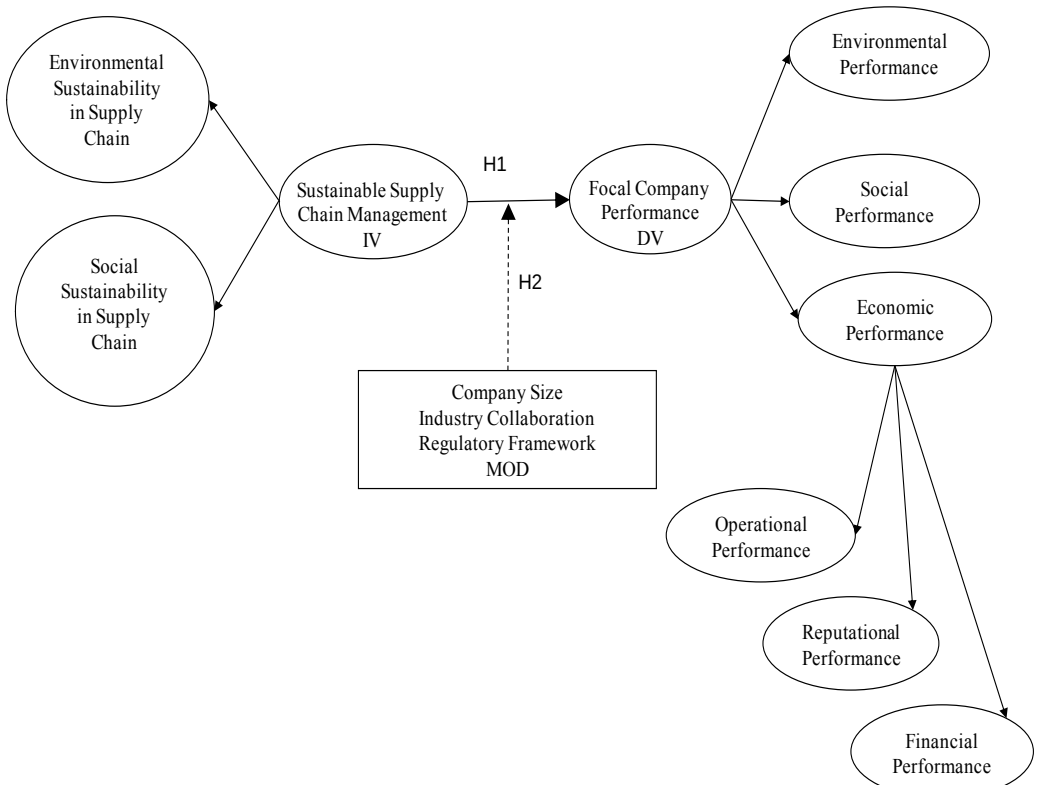

Figure 4.10 Conceptual Model with Hypotheses.

Note. IV = Independent Variables; DV = Dependent Variables; MOD = Moderators**.**

Hypothesis testing for H1.

H1. SSCM impacts company's performance. This section presents the results of testing H1 (see Tables 4.17 through 4.19). First, the results of regressing the focal company's performance on SSCM are presented. Second, the results of regressing the focal company's performance on the two factors of SSCM (i.e., environmental sustainability and social sustainability) are presented. Finally, a summary of regressing individual dimensions of the focal company's performance on SSCM is presented.

Table 4.16 shows the results of performance regressed on SSCM. The results indicate that there is a significant positive relationship between SSCM and performance. The Standard Error of the Regression (S) of .64 suggested that the prediction of performance by SSCM is within 1% of error, implying an accurate prediction. The

regression had an R-squared (R^2) of 66.52%, indicating that 66.52% of the change in performance is accounted for by SSCM. The regression also showed R-squared adjusted (R-sq. adj) of 66.37%. R-Sq adj is used to assess the effect of the number of predictors in the model as discussed in the next paragraph. The model showed an R-squared predicted (R-sq pred) of 65.97%, very close to R^2 of 66.52%, indicating that the model provides valid predictions for new observations. Large values of R-sq (pred) indicate models of greater predictive ability. The regression showed that SSCM had a p-value less than .01, which supports H1. The model had a coefficient (β) of .85, which implies that for every unit increase in SSCM, there is a corresponding positive change of .85 units in performance. Given that this model had only one predictor, the variance inflation factor (VIF) of one confirms the absence of multicollinearity (correlation among predictors).

Table 4.16 *Perfromance Regressed on SSCM.*

Model Summary						
	S	R-sq	R-sq(adj)	R-sq(pred)		
	0.636	66.52%	66.37%	65.97%		
Coefficients						
	Term	Coef	SE Coef	T-Value	P-Value	VIF
	Constant	0.44	0.14	3.24	.00	
	SSCM	0.85	0.04	21.29	.00	1.00

Table 4.17 shows the results when performance was regressed on the two dimensions of SSCM (i.e., ES and SS). The lower t-value of SS (4.84) compared to ES's (5.55) indicates that the latter is a slightly better predictor of performance. This observation is of minor relevance to the regression model given that the p-values confirmed the statistical significance of both independent variables.

Table 4.17 *Performance Regressed on Environmental and Social Sustainability.*

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.641	66.10%	65.80%	65.16%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.47	0.14	3.37	.00	
ES	0.44	0.08	5.55	.00	4.33
SS	0.40	0.08	4.84	.00	4.33

Summarizing the regression of performance on SSCM (Table 4.16) with the regression of performance on ES and SS (Table 4.17) indicates the following:

1) ES and SS are statistically significant with p-values < .01 and the small S values of less than 1 for both regressions point to accurate prediction of performance by SSCM.
2) The high R^2 for both regressions indicate high predictability of performance by SSCM or by its two constitutive elements taken together.
3) ES is a slightly better predictor of performance than SS although both are significant.
4) Finally, in the second regression VIFs for ES and SS were identical at 4.33. This implies the existence of moderate collinearity (correlation between predictors) in the regression analysis.

Table 4.18 shows the different measures of performance regressed on SSCM. It indicates that the regression with PE as the outcome variable is better than the other regressions based on the following:

1) PE had an S score of 0.636 compared to 0.743, 0.712, and 0726 for EnP, SoP, and EcP, respectively.
2) PE had an R^2 of 66.52%. This was higher than the R^2 for EnP (64.05%), SoP (63.73%), and EcP (57.77%).
3) For all regressions, SSCM had a p-value of <.01 indicating that SSCM was statistically significant to, and a predictor of PE as well as of EnP, SoP, and EcP.
4) SSCM explained less of EcP than it explained EnP and SoP based on their respective R^2 of 57.77%, 64.05%, and 63.73%.
5) SSCM had a positive β for all regressions thus confirming its positive relationship with each dimension of performance.
6) The three factors of EcP, i.e., OpP, FiP, and ReP, had R^2 of 44.61%, 43.69%, and 61.56%, respectively. They all scored lower than EcP (57.77%) except for Rep.

Table 4.18 *All Performance Measures Regressed on SSCM.*

Performance Items	S	R-Sq (%)	Coef	SE Coef	T-Value	P-Value	VIF
PE	0.636	66.52					
Constant			0.444	0.137	3.24	.00	
SSCM			0.846	0.039	21.29	.00	1.00
EnP	0.743	64.05					
Constant			0.181	0.160	1.13	.26	
SSCM			0.936	0.046	20.06	.00	1.00
SoP	0.712	63.73					
Constant			0.353	0.154	2.29	.02	
SSCM			0.891	0.044	19.93	.00	1.00
EcP	0.726	57.77					
Constant			0.559	0.157	3.57	.00	
SSCM			0.801	0.045	17.58	.00	1.00
OpP	0.942	44.61					
Constant			0.401	0.204	1.97	.05	
SSCM			0.798	0.059	13.46	.00	1.00
FiP	0.933	43.69					
Constant			0.486	0.202	2.41	.01	
SSCM			0.755	0.058	13.21	.00	1.00
ReP	0.695	61.56					
Constant			0.790	0.150	5.27	.00	
SSCM			0.830	0.043	19.02	.00	1.00

Note. PE = Performance; SSCM = Sustainable Supply Chain Management; EnP = Environmental Performance; SoP = Social Performance; EcP = Economic Performance; OpP = Operational Performance; FiP = Financial Performance; ReP = Reputational Performance.

The test of psychometric properties supported the idea that focal company's performance (PE) as a construct was comprised of three dimensions: environmental performance, social performance, and economic performance. Thus the test of moderation in H2 will be based solely on focal company's performance as a dependent variable and SSCM as the predictor.

Hypothesis testing for H2.

H2. Company size, industry collaboration, and regulatory framework moderate the impact of SSCM on the company's performance. The three sub-hypotheses were tested as follows:

H2a. Company size moderates the impact of SSCM on performance. As shown in Table.4.19, company size and its interaction term with SSCM (SSCM*Size), were added to the regression model to assess its moderation of the SSCM-performance relationship. Although the S, R^2, R-sq (adj) and R-sq (pred) were within ranges comparable to the regression of Performance on SSCM (see Table 4.18), the p-values of size and SSCM*size of .48 and .25 indicated that they were not statistically significant, implying that company size does not moderate the impact of SSCM on performance.

Furthermore the VIFs of 10.73 and 17.08 for size and SSCM*size were high, indicating that their estimated coefficients in the regression were inflated compared with when these predicting variables were not linearly related. However a further analysis of the relationship between these variables using a factorial plot (Figure 4.11) showed that the lines for small and large sizes were nonparallel, suggesting that an interaction occurred, and that there was an impact, albeit moderate, of size on the effect of SSCM on performance. At low levels of SSCM, large companies show superior performance, but small companies show better performance when SSCM is moderate to high.

Table 4.19 *Size as a Moderator of the Relationship Between SSCM and Performance.*

Model Summary					
S	R-sq	R-sq(adj)	R-sq(pred)		
0.64	66.94%	66.49%	65.76%		
Coefficients					
Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.24	0.27	0.90	.37	
SSCM	0.94	0.09	11.10	.00	4.55
Size	0.06	0.09	0.70	.48	10.73
SSCM*Size	-0.03	0.03	-1.15	.25	17.08

Figure 4.11 Factorial Plot of the Effect of Size on the Relationship Between SSCM and Performance

H2b. Industry collaboration moderates the impact of SSCM on performance. As shown in Table.4.20 industry collaboration (ind. collab.), and its interaction term with SSCM (SSCM*ind. collab.), were added to the regression to assess its moderations of the SSCM-performance relationship. Although the S, R^2, R-sq (adj) and R-sq (pred) were within ranges comparable to the regression of Performance on SSCM (see Table 4.18), the p-values of ind. collab. and SSCM*ind. collab. of .48 and .31 indicated that they were not statistically significant, implying a lack of meaningful relationship between these predictors and performance. Furthermore, the VIF of 13.46 (SSCM), 11.31 (ind. collab.) and 34.89 (SSCM*ind. collab.) indicated that these predictors were highly correlated: the variances of their estimated regression coefficients were inflated compared with when these predicting variables were not linearly related. However a further analysis of the

relationship among these variables using a factorial plot (Figure 4.12), showed that the lines for high and low industry collaboration were nonparallel, suggesting that an interaction occurred and that there is an impact, albeit moderate, of industry collaboration on the effect of SSCM on performance. At low levels of SSCM high industry collaboration will drive better performance, but when SSCM is moderate to high, low industry collaboration commands better performance.

Table 4.20 *Industry Collaboration as a Moderator of the Relationship Between SSCM and Performance.*

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.64	66.69%	66.24%	65.36%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.13	0.35	0.37	.72	
SSCM	1.00	0.15	6.78	.00	13.46
Ind. Collab.	0.08	0.11	0.71	.48	11.31
SSCM*Ind. Collab.	-0.04	0.04	-1.02	.31	34.89

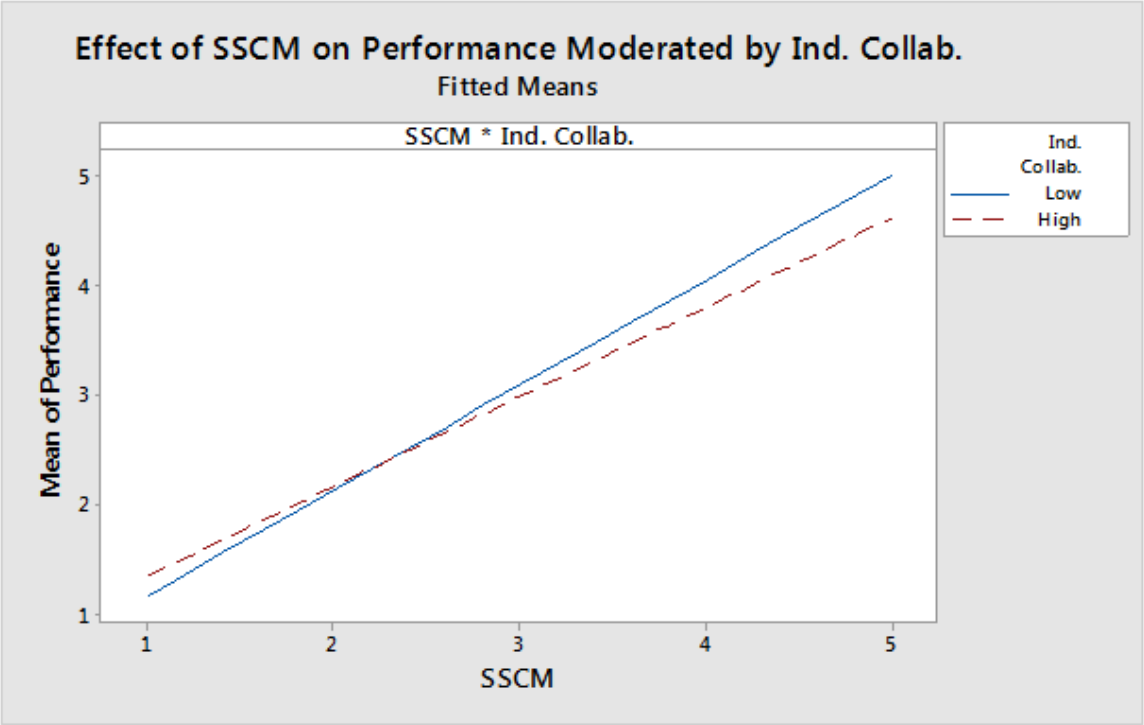

Figure 4.12 Factorial Plot of the Effect of Industry Collaboration on the Relationship between SSCM and Performance.

H2c. Regulatory framework moderates the impact of SSCM on performance. As reported in Table 4.21 the regulatory framework (reg. frame.), and its interaction term with SSCM (SSCM*reg. frame.), were added to the regression model to assess its moderation of the SSCM-performance relationship. The regression model showed S, R^2, R-sq (adj) and R-sq (pred) within ranges comparable with those of the regression of Performance on SSCM (see Table 4.18). The p-value of the interaction term, SSCM*Reg. Frame, was .04, indicating that it was statistically significant. Furthermore, analysis of the relationship among these variables using a factorial plot (Figure 4.13) showed that the lines for high and low regulatory framework were nonparallel, suggesting that an interaction occurred, and there is an impact of the regulatory framework on the effect of SSCM on performance. The statistical significance of the stronger relationship on the plot is reflected by the greater divergence of the two non-

parallel lines past their point of interaction. These results suggest that the regulatory framework is a moderator of the SSCM-performance relationship.

Table 4.21 *Regulatory Framework as a Moderator of the Relationship Between SSCM and Performance.*

Model Summary					
S	R-sq	R-sq(adj)	R-sq(pred)		
0.63	67.36%	66.92%	66.12%		
Coefficients					
Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	1.12	0.36	3.12	.00	
SSCM	0.56	0.15	3.77	.00	13.92
Reg. Frame.	-0.18	0.10	-1.86	.06	7.73
SSCM*Reg. Frame.	0.07	0.03	2.09	.04	30.33

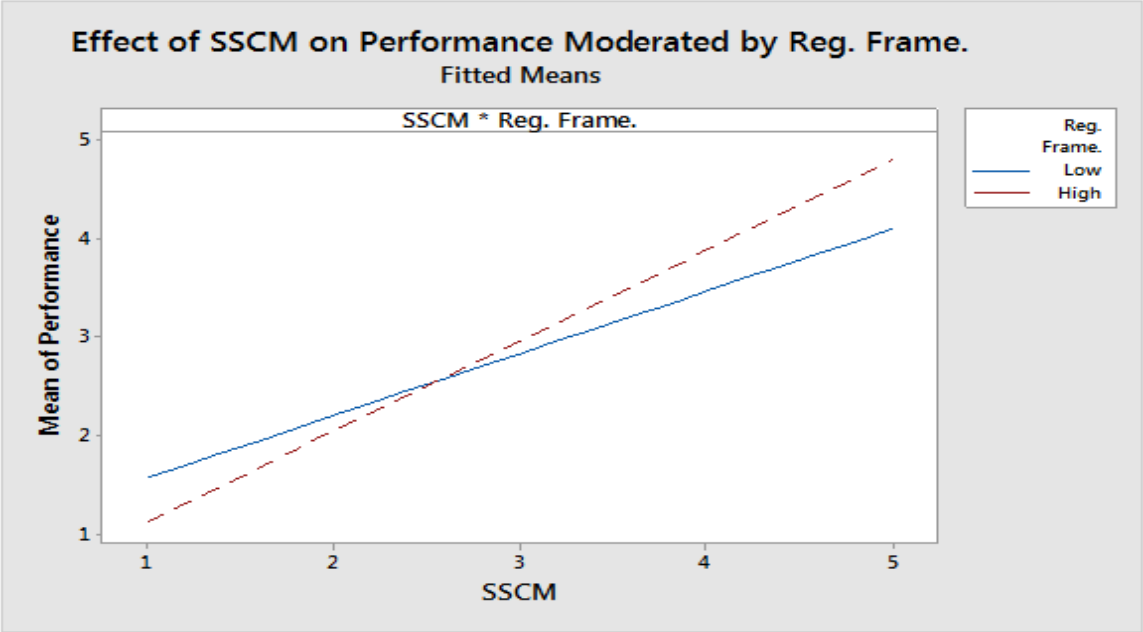

Figure 4.13 Factorial Plot of the Effect of the Regulatory Framework on the Relationship between SSCM and Performance.

Thematic Analysis

Qualitative analysis was the second step in the analysis for this study. It consisted in exploring the respondents' views on the benefits and challenges of SSCM, and ways to

overcome these challenges. The analysis followed Boyatzis' (1998) five-step framework, and its inductive methodology.

Responses to each question were reviewed on four different occasions. The first review sought to identify key words in each response. The second review used the keywords to develop thematic labels and to assign the themes to either the benefits of SSCM, the challenges facing SSCM, or ways to overcome these challenges. The third review validated the themes' assignments, and provided a count for the occurrence of each theme in any individual response. The fourth and final review repeated the preceding to ensure process consistency.

Question 1. The first open-ended question was: What are the major benefits and challenges to environmentally sustainable supply chain management? How can the challenges be overcome? This question sought to inform the main research question (does SSCM contribute to firm performance?) by exploring the respondent's overall perception of environmental sustainability as an activity likely to bring benefits, create challenges, or a combination of both. In total, 10 themes were identified. Given that not all 88 responses addressed each one of the 10 themes, the final count indicated 247 occurrences. These occurrences were grouped into the following three categories (Table 4.22 and Figure 4.14):

1. Benefits in the form of risk mitigation (10% of 247), competitive advantage (9%), CSR, and societal good (14%).
2. Challenges in the form of cost (12%), enforcement and implementation (12%), and lack of common vision or shared commitment to SSCM (8%).

3. Solution to challenges in the form of need to create tools (9%), leadership (8%), industry collaboration (8%), and laws and regulations (11%).

Based on the thematic analysis, CSR and societal good stood out as the major benefits. But nearly 10% saw environmental sustainability in the supply chain as a source of competitive advantage and a risk mitigation tool, hence providing the business rationale for SSCM. Perceived cost, enforcement and implementation difficulties were the major challenges. Proper laws and regulations were the most reported solution to these challenges.

Table 4.22 *Thematic Analysis of Qualitative Responses for Environmental Sustainability*.

Question 1 (Question 23 of survey instrument) *What are the major benefits and challenges to environmentally sustainable supply chain management? How can the challenges be overcome?*			
	Business or micro level	Societal or macro level	Solution to Challenges
Major Benefits	Risk Mitigation and reputation - Stable supply chain - Risk management tool - Facilitate compliance with regulation - Lever to enhance or protect corporate Competitive edge - Leadership in meeting the demands of increasingly sophisticated customers - Contribution to innovation - Guarantor of safer products - Appeal to sustainability conscious investors	- Evidence of good CSR - Altruism - Promote long-term availability of natural resources	
Major Challenges	Cost - Cost hardly justifiable and risk of driving companies into unfavorable competitive position - Long-term horizon of perceived but diffuse benefits Enforcement and implementation - Hard to enforce and embed into business operations - Length and complexity of supply chain: lack of contract with non-direct suppliers make enforcement difficult - Plethora of environmental initiatives and standards of compliance - Difficulty in enacting cross industries and cross sectors collaboration Common vision and alignment - Lack of, or insufficient suppliers awareness and goodwill - Lack of alignment between the focal company vision and the cultural and regulatory framework of suppliers - Green washing		- Create tools to translate perceived benefits into tangible metrics and quantifiable gains - Take a leadership role in training and educating suppliers - Promote industry and sector levels collaboration - Complement corporate initiatives with laws and regulations -Enactment of related laws and regulations

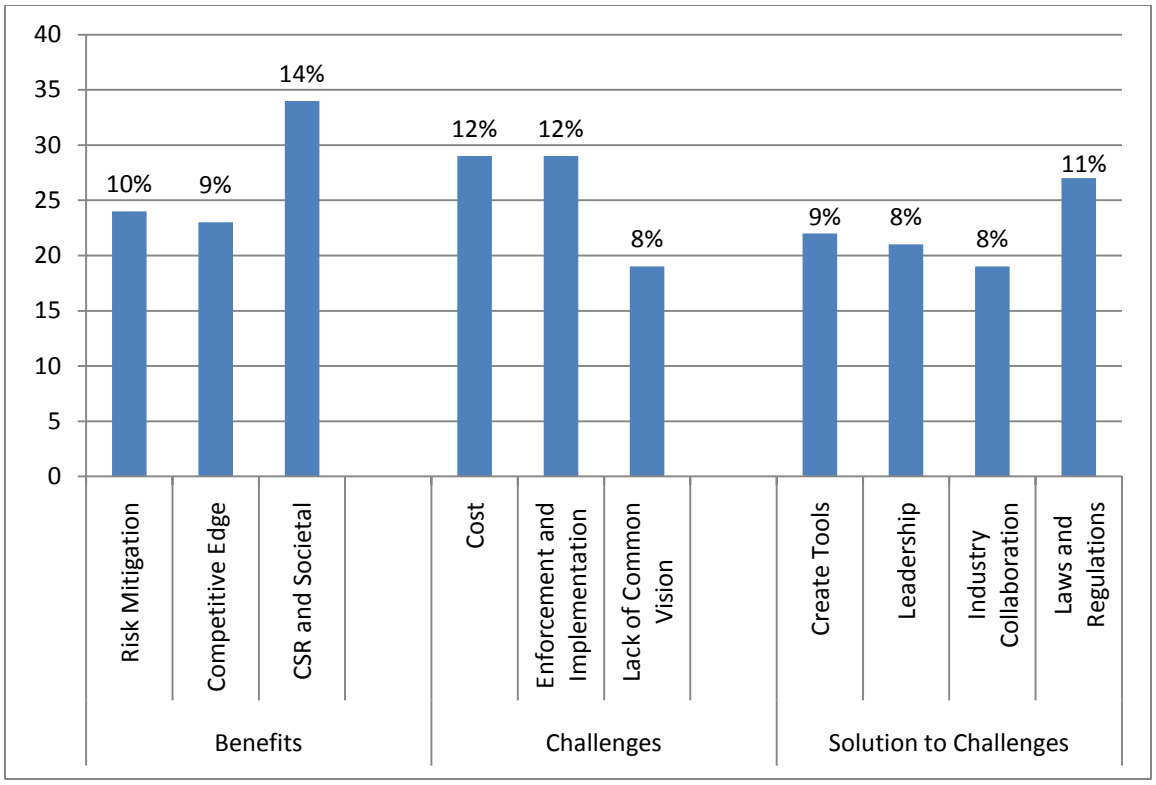

Figure 4.14 Histogram of Themes Identified for Question 1 on Environmental Sustainability.

Question 2. The second open-ended question was: What are the major benefits and challenges to socially sustainable supply chain management? How can the challenges be overcome? This question sought to inform the main research question (does SSCM contribute to firm performance?) by exploring the respondent's overall perception of social sustainability as an activity likely to bring benefits, create challenges, or a combination of both. In total, 10 themes were identified. Given that not all 78 responses addressed each of the 10 themes, the final count indicated 230 occurrences. These occurrences were grouped into the following three categories (Table 4.23 and Figure 4.15):

1. Benefits in the form of risk mitigation (10% of 230), competitive advantage (10%), CSR, and societal good (18%).

2. Challenges in the form of cost (10%), enforcement and implementation (13%), and lack of common vision or shared commitment to SSCM (6%).
3. Solution to challenges in the form of need to create tools (7%), leadership (10%), industry collaboration (6%), and laws and regulations (10%).

Based on the thematic analysis, CSR and societal good stood out as more important benefits (18% vs. 14%) than they were for environmental sustainability discussed above. Similar to environmental sustainability, social sustainability was reported about 10% of the time as a source of competitive advantage and a risk mitigation tool, hence providing the business rationale for SSCM. Also cost and enforcement and implementation difficulties were the major challenges; but they were reported in smaller proportion than they were for environmental sustainability. Corporate leadership coupled with proper laws and regulations were the most reported solutions to challenges. They were reported in proportions (10% and 10%) close to those reported for environmental sustainability.

Table 4.23 *Thematic Analysis of Qualitative Responses for Social Sustainability.*

Question 2 (Question 24 of survey instrument) *What are the major benefits and challenges to socially sustainable supply chain management? How can the challenges be overcome?*			
	Business or micro level	Societal or macro level	Solution to Challenges
Major Benefits	Risk mitigation and reputation - Stable supply chain -Risk management tool -Facilitate compliance with regulation -Lever to enhance or protect corporate reputation Competitive edge -Leadership in meeting the demands of increasingly sophisticated customers -Contribution to innovation -Magnet for diversity conscious talents and employees loyalty -Appeal to sustainability conscious investors	-Evidence of good CSR -Altruism -Attraction of diversity conscious employees -Contribution to a more inclusive society -Promote the respect of Human rights -Social ascension opportunity for persons from socially disadvantaged groups	
Major Challenges	Cost -Cost hardly justifiable and risk of driving companies into unfavorable competitive position -Long-term horizon of perceived but diffuse benefits -Cost associated with monitoring compliance through the supply chain Enforcement and implementation -Hard to enforce and embed into business operations -Multitude of standards of compliance - Length and complexity of supply chain: lack of contract with non-direct suppliers make enforcement difficult - Difficulty in enacting cross industries and cross sectors collaboration -Difficulties in finding qualified workers within socially disadvantage groups Lack of common vision and alignment - Lack of, or insufficient suppliers awareness and goodwill - Lack of alignment between the focal company vision and the cultural and regulatory environment of suppliers		-Create tools to translate perceived benefits into tangible metrics and quantifiable gains -Take a leadership role in training and educating suppliers -Promote industry and sector levels collaboration -Compliment corporate initiatives with laws and regulations -Enactment of related laws and regulations

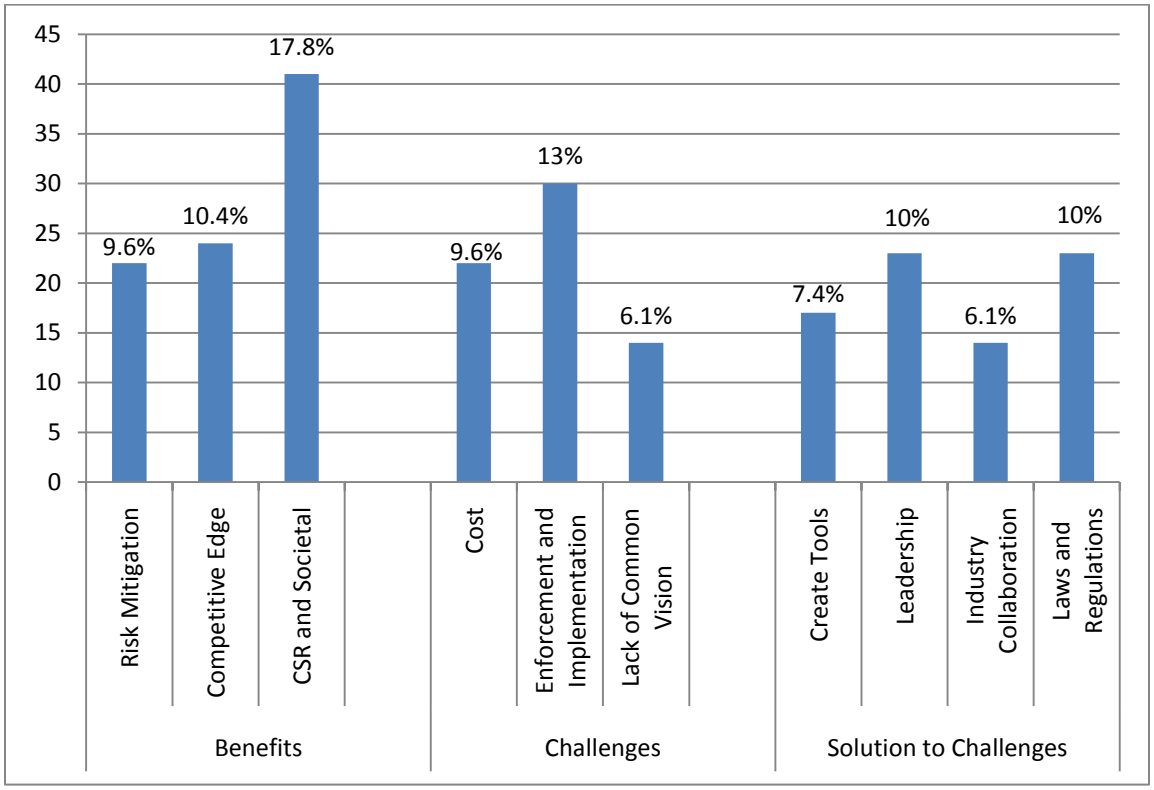

Figure 4.15 Histogram of Themes Identified for Question 2 on Social Sustainability.

Summary

This chapter presented the analyses of the 242 responses to the 24 questions in the survey. The analyses helped answer the following research questions:

1. Does SSCM impact the focal company's performance?
    a. Does SSCM impact focal company's environmental performance?
    b. Does SSCM impact focal company's social performance?
    c. Does SSCM impact focal company's economic (operational, financial, and reputational) performance?

2. Do moderating factors (company size, industry collaboration, and regulatory framework) influence the relationship between SSCM and focal company performance?

Answering these research questions provided an understanding of the relationships between SSCM and focal company performance, and the impacts that company size, industry collaboration, and regulatory framework had on the relationship between SSCM and performance.

The analysis confirmed hypothesis H1: SSCM has a positive relationship with firm performance. This confirmation was also validated when the hypothesis was tested based on the two elements of SSCM. SSCM had a significant and positive impact on all measures of performance. But the biggest impact was on reputational performance, suggesting that SSCM is perceived more as a reputation enhancer than a factor likely to contribute directly to the bottom line.

H2 was tested for each of the three moderators. For H2a, the size x SSCM interaction term was not significant in the multiple regression, but the factorial plot indicated that the lines for large and small size were non parallel, implying that there was a difference in the impact of SSCM on performance based on size. Performance of large companies benefited less from SSCM than smaller companies.

For H2b, the interaction term ind/collaboration x SSCM was not significant in the multiple regressions, but the factorial plot indicated that the lines for low and high industry collaboration were non parallel. This implied that there was a difference in the impact of SSCM on performance when industry collaboration was low versus when it was high. In a context of high industry collaboration, performance appeared to be less

affected by SSCM in comparison to a context of low industry collaboration where SSCM appeared to facilitate superior performance.

Finally for H2c, the interaction term of reg/framework x SSCM was significant in the multiple regression. This was confirmed by the factorial plot that showed that the lines for low and high reg/framework were non parallel, and the two lines were further apart past their point of intersection compared with the factorial plot for the H2a and H2b. In a context of high regulation, SSCM has a higher impact on performance than in a context of low regulation.

The thematic analysis yielded 10 themes that explored the benefits, challenges, and solutions to the challenges of SSCM. CSR, Risk mitigation, enhanced reputation, and creation of a competitive advantage were the major benefits for SSCM. Perceived cost, enforcement and implementation difficulties, and lack of shared commitment to SSCM were the major challenges to SSCM. Solutions to these challenges included the creation of effective tools to measure the impact of SSCM, leadership in promoting SSCM, collaboration and sound laws and regulations.

Triangulation (meta inference) of the quantitative and qualitative analysis showed that the quantitative finding that SSCM had a positive relationship to performance was corroborated by the qualitative findings that the benefits SSCM included reputational and CSR performance. Also, respondents perceived that SSCM could help the focal company mitigate risk and create a competitive advantage by attracting sustainability-conscious stakeholders (customers, employees, investors, and NGOs concerned with environmental and social issues). This is critical for the future SSCM given that it will benefit from being justified on a sound business rationale.

Based on R^2 SSCM explains 67% of performance, this is a very high R^2 that explains two thirds of the variance in performance. The remaining 33% could be due at least in part to the challenges (cost, difficult implementation, and lack of shared commitment to SSCM) evoked in the qualitative analysis. Solutions to these challenges included the need for more leadership, industry collaboration, and sound laws and regulations, which were found to be a significant moderator of the relationship between SSCM and performance based on regression factorial plot analysis.

Chapter 5 Discussion and Recommendations

Introduction

This study investigated the relationship between sustainable supply chain management (SSCM) and company performance. It identified the aspects of performance most affected by SSCM. The study also investigated the moderating effects of company size, industry collaboration, and regulatory framework on the SSCM-performance relationship. Quantitative and qualitative data were collected with an electronic survey administered through Survey Monkey. Descriptive statistics of the data were presented using frequency distributions, means, and standard deviations. Data analysis was conducted using mixed methods: regression-based inferential statistics and factorial plot for quantitative analysis and thematic analysis for qualitative data. Finally, triangulation was used to integrate the quantitative and qualitative analyses. This chapter discusses the results of the hypotheses tested and thematic analysis, implications and recommendations for practice, recommendations for future research, and concludes with the potential limitations of the study.

Summary of Results and Discussion

The sample included 242 participants from publicly traded (40%), privately held (53%), and mixed-ownership (7%) companies operating in the Automotive, Electronics, Telecommunications, and Aerospace industries. The majority (60%) of respondents were from the automotive industry. Survey respondents were from companies that had worldwide sales of at least five billion US dollars (50%), 250 suppliers or more (60%), suppliers located in ten or more countries (62%), and LLD of four or more (27%).

Survey participants were from global organizations that managed large, complex, and multi-national supply chains.

The survey instrument was administered on-line to professionals, 45% of whom were employed in either sustainability or supply chain management functions. The survey included questions designed to assess respondents' perceptions of their companies' engagement in SSCM policies and practices, and the effects of SSCM on their environmental, social, and economic performance.

The SSCM construct was assessed in terms of environmental and social sustainability. The performance construct was measured by the effects of SSCM on environmental, social, and economic performance. The latter consisted of operational, reputational, and financial performance.

The psychometric properties of SSCM and performance were evaluated using Cronbach's coefficient alpha test of internal consistency reliability (Cronbach, 1951) and the AVE test of convergent validity (Chin, Gopal, & Salisbury, 1997; McLure, Wasko & Faraj, 2005; Wixom & Watson, 2001). SSCM had an alpha coefficient of .953 and performance a value of .960, indicating excellent reliability for both. Cronbach's alpha for SSCM dimensions (environmental sustainability—.911, and social sustainability—.914) were also excellent. Cronbach's alpha for the performance dimensions (environmental, social, and economic performance) ranging from .85 to .93 were good to excellent. The economic performance factors showed alpha ranging from .81 to .89. All constructs and their dimensions and factors had AVE ranging from .618 to .792. They met the AVE threshold of .50, suggesting that the questionnaire was valid.

Two research questions were addressed in this study:

Q1. Does SSCM impact focal company's performance?

- Does SSCM impact focal company's environmental performance?
- Does SSCM impact focal company's social performance?
- Does SSCM impact focal company's economic performance?

Q2. Does company size, industry collaboration, and the regulatory framework moderate SSCM's impact on performance?

- Does company size moderate SSCM's impact on focal company's performance?
- Does industry collaboration moderate SSCM's impact on focal company's performance?
- Does the regulatory framework moderate SSCM's impact on focal company's performance?

Two hypotheses were tested to answer the research questions:

H1. SSCM (environmental sustainability and social sustainability in the supply chain) impacts focal company's performance.

- H1a: SSCM impacts focal company's environmental performance.
- H1b: SSCM impacts focal company's social performance.
- H1c: SSCM impacts focal company's economic performance.

H2. Company size, industry collaboration structure, and the regulatory framework moderate the impact of SSCM on focal company's performance.

- H2a: Company size moderates the impact of SSCM on focal company's performance.

- H2b: Industry collaboration moderates the impact of SSCM on focal company's performance.
- H2c: Regulatory framework moderates the impact of SSCM on focal company's performance.

The conceptual model and the hypotheses tested are shown in Figure 5.1.

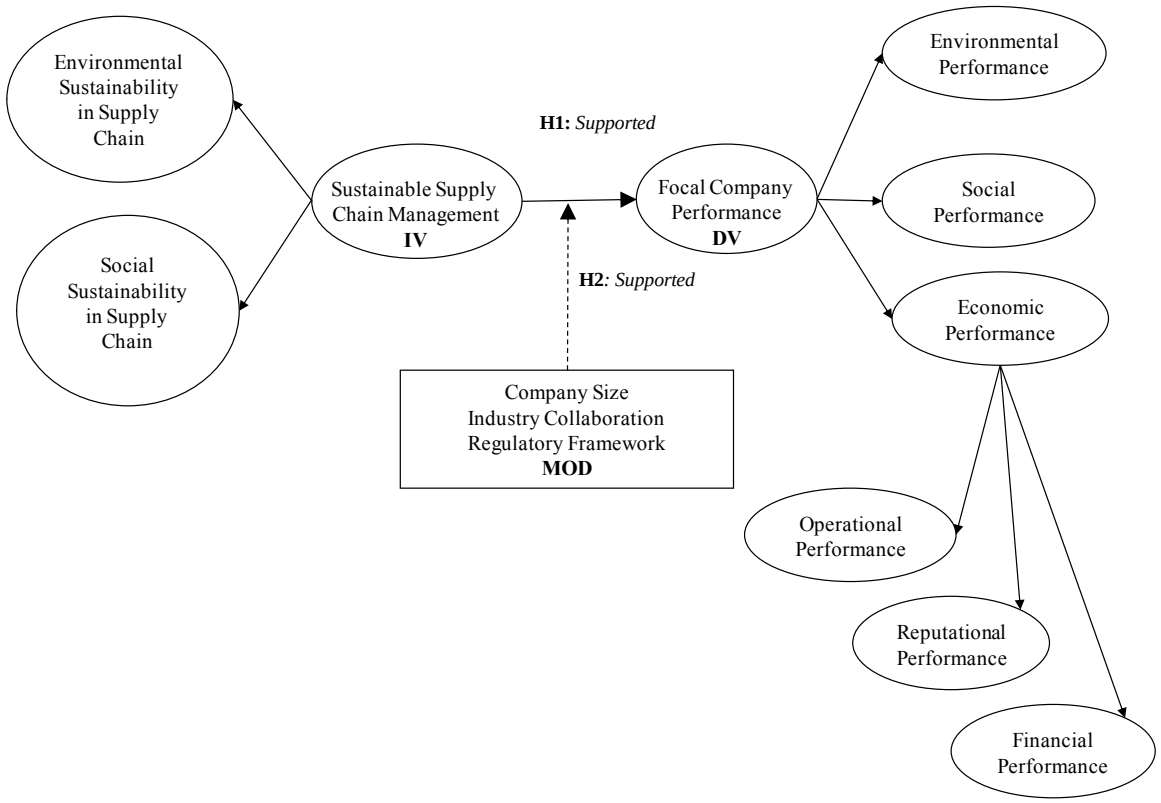

Figure 5.1 Model of the Study: SSCM Impact on Performance and Moderation of SSCM-Performance Relationship.

Hypothesis 1 (H1). H1 addressed the first research question by evaluating if SSCM impacts company performance. It looks at the impact of SSCM on each dimension of performance:

H1. SSCM (environmental sustainability and social sustainability in the supply chain) impacts focal company's performance.

- H1a: SSCM impacts focal company's environmental performance.
- H1b: SSCM impacts focal company's social performance.
- H1c: SSCM impacts focal company's economic performance.

Results for H1 show that SSCM has a positive impact on focal company performance and its three dimensions (environmental, social, and economic performance). Thus SSCM's contribution to performance depends on sound supply chain actions by the focal company (Hall et al., 2011). This result provides a strong business rationale for promoting and adopting SSCM.

SSCM is a significant predictor of performance with a beta coefficient (β) of .85. This indicates that every unit increase in SSCM increases performance by .85 units. Both ES and SS, with βs of .44 and .40, are also predictors of performance. But, further inferential statistics analyses were conducted with only SSCM as the predictor.

The R^2 analysis indicated that SSCM explained over 43% of the variance in all dimensions of performance. The explanation of variance in environmental performance (R^2 = 64.05%) was better compared with social performance (R^2 = 63.72) and economic performance (R^2 = 57.77%). This is in line with the literature that finds that the environmental impacts of SSCM is more pronounced than its social or economic impact.

All three factors of economic performance were explained differently by SSCM with SSCM having the strongest impact on reputational performance (R^2 = 61.56%). Compared with reputational performance, the explanation for financial performance (R^2 = 43.69%) was weaker, corroborating Delmas et al. (2013) assertion that SSCM's impact on financial performance is associated with process (not outcome). Likewise the weaker explanation for operational performance (R^2 = 44.61%) supports the argument of Tate et

al. (2010) that SSCM's impact on operational performance is indirect. Interestingly, the R^2 for reputational performance is more in line with the findings for environmental and social performance. This is consistent with the argument that SSCM enhances company's reputation (Mason & Simmons, 2014).

Hypothesis 2 (H2). H2 addressed the second research question. It evaluates the moderating effect of company size, industry collaboration, and regulatory framework on the SSCM-performance relationship.

H2. Company size, industry collaboration structure, and the regulatory framework moderate the impact of SSCM on focal company's performance.

- H2a: Company size moderates the impact of SSCM on focal company's performance.
- H2b: Industry collaboration moderates the impact of SSCM on focal company's performance.
- H2c: Regulatory framework moderates the impact of SSCM on focal company's performance.

H2a: Weakly supported. Company size moderates the impact of SSCM on focal company's performance. Although the results of the hierarchical regression analyses with company size (size) and SSCM*size show p-values of .48 and .28 (not statistically significant at the 95% confidence interval) for size and SSCM*size, the factorial plot shows that the paths for large and small companies are non-parallel, suggesting that size moderates the SSCM-performance relationship. Contrary to Golicic and Smith's (2013) assertion that companies of any size could achieve similar results based on SSCM practice, the factorial plot analysis (Figure 4.11) shows that large companies can achieve

performance levels superior to small companies when SSCM is low. But when SSCM is moderate to high small companies are likely to achieve higher performance than large companies; this could be because, as Fombrun and Shanley (1990) put it, large companies are more vulnerable to negative public relations campaigns mounted by sustainability-conscious stakeholders.

H2b: Weakly supported. Industry collaboration moderates the impact of SSCM on focal company's performance. Although the hierarchical regression analysis shows p-values of .48 and .31 (not statistically significant at the 95% confidence interval) for industry collaboration (collaboration) and the SSCM*collaboration interaction term, the factorial plot analysis (Figure 4.12) indicates that the paths for low and high collaboration are non-parallel. This suggests that industry collaboration moderates the SSCM-performance relationship as contemplated by Golicic and Smith (2013) who argue that in the field of SSCM, industry collaboration does matter. The factorial analysis shows that performance is higher for low levels of industry collaboration when SSCM is low. But when SSCM is moderate to high, low industry collaboration appears to drive higher performance. This might have to do with companies internalizing more of their SSCM activities as the stakes for SSCM grow higher thus rendering the reliance on industry collaboration less meaningful.

H2c: Supported. Regulatory framework moderates the impact of SSCM on focal company's performance. The results of the hierarchical regression analyses with the SSCM and regulatory framework interaction term showed that regulatory framework does moderate the impact of SSCM on performance. The p-value for regulatory framework was .06 (>.05) indicating that it is not statistically significant. With a p-value

of .04 the SSCM*regulatory-framework interaction term was statistically significant. The factorial plot analysis (Figure 4.13) also showed that the paths for low and high regulatory frameworks are non-parallel, and have a greater divergence from their point of intersection compared with the plots for the moderation effects of size and industry collaboration. Thus regulatory framework is found to be a moderator of the SSCM performance relationship; as Liu et al. (2012) put it, the regulatory framework is part of a set of externalities that influence SSCM adoption. In a context of high levels of regulation, moderate to high SSCM command lower performance compared with a context of low SSCM activities in which high regulatory frameworks command superior SSCM performance. These findings suggest that if the regulatory pressure is low, moderate to high SSCM activities will yield higher performance; early adopters of SSCM reap its performance benefits. However, if the regulatory pressure is moderate to high, higher SSCM activities result in lower performance. This could be explained by the fact that strong enforcement of regulations tend to move SSCM activities into the area of legal compliance.

Thematic-qualitative discussion. Two open-ended questions were included in the questionnaire to collect qualitative data on respondents' views of SSCM's benefits, challenges, and solutions to challenges. The thematic analysis served to further inform the findings of hypotheses 1 and 2.

- What are the major benefits and challenges to environmentally sustainable supply chain management? How can the challenges be overcome?
- What are the major benefits and challenges to socially sustainable supply chain management? How can the challenges be overcome?

Each of the 166 answers for both questions was reviewed to support the development of themes for the thematic analysis. The ten themes developed were grouped into the three categories of benefits, challenges, and solutions.

Benefits of SSCM. For both environmental sustainability and social sustainability, CSR and societal good, risk mitigation, and competitive edge emerged as major benefits. They were all supported by H1.

CSR and societal good. Overall, CSR and societal good was the most frequently reported benefit for both environmental and social sustainability. They align with the quantitative findings for environmental, social, and economic performance analyzed with H1. The CSR and societal benefits were reported to help preserve the long-term availability of natural resources, promote respect for Human Rights and foster a more inclusive society, and support the reputational performance of the focal company by preserving or enhancing its image as a good citizen**.**

Risk mitigation. Risk mitigation was the second most frequently reported benefit of SSCM. In mapping risk mitigation to the study's constructs, it aligns with reputational performance. Companies that adhere to sound SSCM practices are better equipped to mitigate the risk of secondary stakeholders, e.g., NGOs and the media, mounting negative public relations campaigns against them by making demands or driving primary stakeholders, customers and shareholders, to make demands on the company (Mandal, 2011; McGuire et al. 1998, Van Der, 2008). In his suggestions to companies for risk mitigation, Cavanagh (2008) recommends a four-step approach based on optimizing compliance with the law, observing social justice, respecting the utilitarian principle, and caring for the environment and society at large. These recommendations capture the TBL

approach to business as contemplated by Elkington (1978) and were adopted for this study of SSCM and performance.

Competitive edge. The last theme in the benefit category was the ability of SSCM to create a competitive edge if leveraged properly. This theme also aligns with the economic performance factor in the sense that belonging to a sustainable supply chain allows the company to tap into a specific assortment of resources as Hunt and Arnett (2003) observed in their analysis of the resource advantage theory of SCM.

Challenges to SSCM. Difficulties in implementation and enforcement, cost, and lack of shared vision among OEMs and suppliers were the three themes that merged in the challenges to SSCM category. They are summarized below in the same order.

Difficulties in implementation and enforcement. These difficulties emerged as the top challenge for environmental sustainability and social sustainability. Contracts and industry collaboration are primary tools that could help overcome these challenges. Because contracts are the nexus of the relationship in the TCE model (Williamson, 2002), focal companies can enforce implementation of their SSCM initiatives by tier-one suppliers. However the contract is not applicable beyond contracting parties. There is then a need for other mechanisms to reach sub-tier suppliers, such as industry collaboration, social structure and trust-based governance to enable supply chain wide compliance (Hunt & Arnett, 2013).

Cost. Remarkably cost was mentioned as a challenge in only about10% of the responses. This could be a tacit recognition that cost is not really a limiting factor for SSCM, nonetheless it constitutes a notable challenge given that financial performance was least affected by SSCM.

Lack of alignment between focal company and suppliers. This challenge, although not directly tied with a specific study construct, speaks to the commanding role of the focal company, and can be associated with industry collaboration. The leadership role of the focal company in championing a SSCM agenda throughout the supply chain (Larkin, 2006; Laszlo, 2008) is critical for broad SSCM adoption.

Solution to challenges. The four emerged themes under this category were: laws and regulations, leadership, tools, and industry collaboration.

Laws and regulations. This theme was evoked as an answer to the enforcement issues for both environmental and social sustainability. Complementing individual company's SSCM initiatives with legal mandates will facilitate implementation among non-contracting parties, and supplement the void created by the lack of contract among some supply chain actors. This finding was supported by H2.

Leadership. Leadership as a theme was raised as an antidote to the challenge of the lack of alignment on SSCM's goals and expectations between the focal company and its suppliers. The leading company is expected to set the tone and model the behavior expected of its suppliers. But as shown by the quantitative findings the OEMs' leadership role needs to go beyond setting expectations, and include more concrete actions including developing and propagating standards of compliance, and incorporating SSCM requirements in suppliers' scorecards.

Tools' creation. The creation of tools to enable compliance is directly related to the implementation challenge. If focal companies are expecting efficient compliance from their suppliers, they ought to devise standard tools, and require their dissemination

throughout the supply chain to help lessen the compliance burden on all participants in the supply chain.

Industry collaboration. The moderating role of collaboration at the industry association level was supported by H2. Industry collaboration will help address the lack of alignment among focal companies and suppliers on SSCM's expectations and goals. It will also help facilitate implementation of SSCM initiatives through the adoption of common tools and principles, which will ultimately help lessen compliance cost and the administrative burden on suppliers. Collaboration at the level of the industry association could assist in addressing both customers' requirements for disclosure, and suppliers' protection of commercially sensitive information. The industry association could play the role of clearing house for information.

Implications for Practice and Recommendations

This study investigated the impacts of SSCM on company's performance, and the moderating effects of company size, industry collaboration, and the regulatory framework on the SSCM-performance relationship. It found that SSCM impacted performance and that the three moderators had an effect on the SSCM performance relationship. These findings support seven major recommendations.

The first recommendation is that practitioners can use the finding that SSCM contributes to company performance to justify the sustainability approach to SCM. The power of this finding is somewhat diluted by the fact that economic performance was less impacted by SSCM than environmental and social performance. However, the impact on reputational performance, a dimension of economic performance, was found to be comparable to the impact on environmental and social performance. This is a very

important finding because reputational performance is an indicator of future financial performance. The growing influence of socially responsible stakeholders (investors, customers, and NGOs) who emphasize corporate social responsibility increases the value of reputational performance (Glavas & Mish, 2015; Wolf, 2014; McGuire et al., 1998).

The second recommendation is that focal companies should put more emphasis on other measures of SSCM beyond monitoring suppliers' actions. Although these companies value the contribution of SSCM to performance, they do not vigorously promote cascading of standards to sub-tier suppliers, or rewarding suppliers for SSCM performance. Monitoring suppliers' performance on SSCM was the SSCM practice that focal companies engaged in the most. Other actions, including providing suppliers with tools to make implementation of SSCM more effective, setting standards for compliance, and requiring that first tier suppliers cascade adopted standards to lower-tier suppliers represent missed opportunities to drive propagation of SSCM throughout the supplier chain.

The third recommendation is for focal companies to provide suppliers with powerful market incentives to adopt SSCM. Incentives in the form of additional business and inclusion of SSCM metrics in suppliers' scorecards will signal the value placed on SSCM and speed up supply chain-wide compliance with SSCM expectations (Rae et al, 2015). Also rewarding SSCM-compliant suppliers with additional business could help mitigate the compliance cost they report as a challenge to SSCM implementation and contribute to rapid adoption of the OEM's agenda.

The fourth recommendation is that focal companies should give more consideration to third-party's evaluations and rankings of their SSCM performance. The

study found that companies valued internal measures of SSCM performance at suppliers' sites (Stefan & Roger, 2014) over those reported by third party organizations. These third-party assessments of SSCM performance ranked poorly compared to internal perceptions of performance. Companies could more effectively utilize these external, perhaps more objective and neutral, assessments to further measure and promote SSCM performance. OEMs should promote greater use of these third party rankings by including them in their suppliers' scorecards.

The fifth recommendation is that OEMs and policymakers should work together to achieve more effective SSCM through fact based regulations. The finding that the regulatory framework has the most powerful moderating effect on the SSCM-performance relationship provides an opportunity for OEMs to take a more active role in working with policymakers to create a regulatory framework that more effectively promotes SSCM from a good business perspective. Greater communications, cooperation, and information sharing among OEMs and policymakers could better achieve both social and company goals. Companies should work with policy makers to craft a regulatory framework that provides greater certainty and reduces risks; rewards innovation; minimizes differential competitive effects among suppliers; and supports OEMs efforts to promote SSCM with supportive regulatory requirements (Rotter et al, 2014).

The sixth recommendation is that companies should leverage the moderating effect of company size on the SSCM-performance relationship. Large companies, that have more resources and influence on the supply chain, are more likely to reap performance benefits from SSCM, should use their position to further promote SSCM

across the supply chain. Smaller companies, despite the lack of evidence of SSCM contribution to their performance, could also use SSCM as a strategic tool to differentiate themselves in the market place and to be viewed more favorably by OEMs (Bourlakis et al., 2014).

The last recommendation is that focal companies should promote greater industry collaboration on SSCM. Greater industry-wide collaboration in developing and adopting common tools, standards, polices, and practices across the supply chain will reduce compliance cost, lower risks, and facilitate performance and compliance monitoring (Ince & Ozkan, 2015).

Recommendations for Future Research

Future research is needed to advance, broaden and deepen understanding of the relationships among SSCM and organizational performance. Greater understanding of the implications of these relationships would strengthen the case for adopting SSCM. Five suggestions for such research follow.

The first area for future research is to identify the important drivers of SSCM. These drivers could include competitive pressure, external stakeholder pressure, and leaders' commitment. Identifying these critical drivers and their effects on SSCM could help focus and strengthen the efforts to promote SSCM (Wolf, 2014).

The second area for future research is to assess the performance effects of different SSCM practices on performance, including the use of SSCM metrics in suppliers' scorecards and reward for performance. This research would help identify and promote the use of the most effective instruments for promoting SSCM (Govindan et al, 2014).

The third area for future research is to explore under which conditions SSCM could have performance impacts that are comparable to other traditional measures of supply chain performance like quality, cost, and on-time-delivery. This study could show that practices that lead to effective SSCM are similar to best practices in other traditional supply chain management performance measures (Sacaluga & Frojan, 2014).

The fourth avenue for future research is to investigate how the macroeconomic environment affects the SSCM-performance relationship. This study could compare the strength of this relationship during times of negative, low, moderate and high economic growth, perhaps finding that companies tend to lose focus on SSCM during economic slowdowns as was noted in the 2002-2010 assessment of the European auto industry (Brandenburg, 2016). Such analyses could help companies adapt their SSCM strategies to the exigencies of the external competitive environment.

The fifth and last recommendation for future research is to explore the nature of the SSCM-performance relationships among countries with different environmental conditions, regulatory, and economic systems. Such studies would enhance overall understanding of SSCM under a wide variety of circumstances, and might suggest alternative approaches to SSCM that could be adopted in the U.S. (Parmigiani & Rivera-Santos, 2015).

Study's Limitations

Although this research has shed some light on the SSCM-performance relationship and its moderators, there were some limitations related to the structure of the sample, the type of data used, and the selection of the study's participants. Four limitations are discussed.

The first limitation of this study stems from the fact that some companies could find themselves playing the dual role of focal company and supplier. This makes it impossible to have an exclusive group of focal companies whose performance could be analyzed distinctively from other supply chain participants. But the practical benefits of such an analysis are limited because supply chain management practices like outsourcing and directed-source have blurred the line between the focal company that buys the product and the traditional supplier that owns, makes and sells the product (Rita & Krapfel, 2014).

The second limitation is that the study is not based on publicly reported data that might be more objective. This limitation could be overcome if companies were required to publicly report SSCM performance data. But making good use of publicly reported data is not without challenges, and only publicly traded companies are required to produce the data and they are not always presented in the form needed to support the analysis of SSCM (Kimble & Milolidakis, 2015).

The third limitation is due to self-reporting of data, the validity of the data, and the potential for common method bias. Common method bias occurs when the data for independent, dependent and moderating variables come from the same source. An ideal scenario would be to collect the data for these different variables from different sources. Conducting such a study would require more elaborated sampling techniques without the guarantee of a better outcome.

The fourth and final limitation of this study is the bias inherent with self-selection sampling technique in the data collection process. Allowing survey participants to self-

select could lead to limited representativeness, reduced ability to generalize and the exaggeration of some of the study's findings. But despite its limitations self-selection sampling has the benefit that the persons who voluntarily agree to participate could be more committed and willing to provide insights into the phenomenon being studied by answering qualitative questions (Khazaal et al., 2014; Rose et al., 2015).

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Appendix A

Certificate of Training

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Jean-Paul Meutcheho** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 12/15/2013

Certification Number: 1344883

Appendix B

IRB Letter of Approval

Institutional Review Board
Office of the Provost
research.ltu.edu
irb@ltu.edu

April 17, 2014

Jean-Paul Meutcheho
DBA Candidate
Lawrence Technological University
tcheho30@hotmail.com

Re: IRB Protocol #00514

Dear Jean-Paul,

I am pleased to report that your IRB application to conduct research with human participants for your DBA dissertation "A Sustainability based-approach to Supply Chain Management" has been approved for a period of one year, April 17, 2014 –April 17, 2015.

The IRB is satisfied that the following ethical concerns regarding the treatment of human research participants has been addressed in your research protocol:

1. The research involves administering a survey to participants who will voluntarily consent to the interview and who are free to withdraw from the study at any time;
2. You have identified potential risks to you and the participants;
3. You have assured that a balance exists between potential benefits of the research to the participants and/or society and the risk assumed by the participants.

Please contact the IRB if an extension is required after one year. Please note you must contact the IRB if any changes are made to the research protocol that impact the ethical treatment of the research participants.

Please do not hesitate to contact the IRB if you have any questions.

Sincerely,

Matthew Cole, Ph.D.
Chair, Institutional Review Board (IRB)
Lawrence Technological University
irb@ltu.edu o: 248.204.3096 f: 248.204.3099

The Lawrence Tech IRB is organized and operated according to guidelines of the United States Office for Human Research Protections and the United States Code of Federal Regulations and operates under Federal Wide Assurance No. FWA00010997 that expires 02/10/2017.

Appendix C

Informed Consent

Sustainable Supply Chain Management Survey

Informed Consent to Participate in Sustainable Supply Chain Management Survey

Mr. Jean-Paul Meutcheho, DBA Candidate, Lawrence Technological University, College of Management, invites you to be a part of a study on the profitability of sustainable supply chain management. This research study looks at the perceptions professionals have about sustainable supply chain management contribution to company's performance. The purpose of the study is to explore and understand how and under what conditions a sustainable supply chain management can be justified on economic ground, well beyond the often cited environmental and social grounds. I am asking you to participate because you are dealing with supply chain or sustainability matters in your profession.

If you agree to be part of the research study, you will be asked to complete a computer survey that asks you to provide your perception of how your company views sustainable supply chain management as it relates to your company's performance. We expect this survey to take 20 to 30 minutes to complete.

While you may not receive any direct benefit for participating, we hope that this study will contribute to the development of a robust argument for justifying a company sustainability-based approach to supply chain management on economic ground and, support the development of a body of knowledge on the topic of sustainable supply chain management as a company performance enhancer.

Researchers will not be able to link your survey responses to you, but they will know that you participated in the research if you provide your contact information. We plan to publish the results of this study, but will not include any information that would identify you.

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. You may choose to not answer an individual question or you may skip any section of the survey by skipping the question or clicking "Next" at the bottom of each survey page to move to the next question.

Regarding compensation, please note that you will not be provided with any monetary compensation for participating in this study.

If you have questions about this research study, you can contact Mr. Jean-Paul Meutcheho, at 610 718 6056 or tcheho30@hotmail.

If you have questions about your rights as a research participant, please contact the Lawrence Technological University Institutional Review Board, 21000 West Ten Mile Road, Southfield, MI 48075, (248) 204-3541, irb@ltu.edu.

If you have read this informed consent form, understand the information contained in this informed consent form, and agree to participate in this study, click on the "Next" button located at the bottom of the first page of the online survey. If you do not wish to participate, click the "X'' in the top corner of your browser to exit.

Appendix D

Survey Instrument

Sustainable Supply Chain Management and Company Performance Survey

Survey

1. Informed Consent
2. Indicate which industry your company belongs to
    a. Automotive
    b. Electronics
    c. Telecommunications or Information Technology
    d. Aerospace
    e. Other (specify)
3. Does your company produce in, or have suppliers, or customers in Canada, Mexico, or the United Stated?
4. What is the ownership of your company?
    a. Privately owned
    b. Publicly owned (traded on stock exchange)
    c. Other (specify)
5. How many people were employed by your company worldwide at the end of 2013?

a. <100

b. 100 - 499

c. 500 - 4,999

d. 5,000 - 9,999

e. 10,000+

6. What was your company's worldwide sales in 2013 (in $US)?

a. <100 $Million

b. 100 Million - 499 Million

c. 500 Million - 4.9 Billion

d. 5 Billion - 9.9 Billion

e. 10 Billion +

7. Which function best describes your current position in your company?

a. Sustainability (Corporate Responsibility, Social and/or Environmental Management, Safety Health and Environment)

b. Supply Chain Management (Purchasing, Procurement, Supplier Quality Assurance, Logistics…)

c. Finance, Compliance/Legal, or Corporate Strategy

d. Marketing, or Sales

e. Engineering, Product Development, Quality Control or other Technical

f. Other (specify)

8. How large is your company's worldwide supply base (number of suppliers)?

a. <50

b. 50-249

c. 250-499

d. 500-999

e. 1,000+

9. In how many countries are your company's suppliers located?
    a. 1-4
    b. 5-9
    c. 10-14
    d. 15-19
    e. 20+
10. What is the longest logical distance (number of intermediate suppliers, i.e. those who don't supply directly to your company) between your company and its raw materials?
    a. 1 to 3
    b. 4 to 6
    c. 7 to 9
    d. 10+
    e. Don't know

Using the definitions given below, please answer the following questions.

Environmental sustainability: policies, practices, and actions taken to minimize the negative impact of company's actions on the natural environment. It encompasses measures to limit air pollution, water pollution/usage, toxic waste, deforestation, climate change . . .

Social sustainability: policies, practices, and actions taken to improve the safety, health, and well-being of communities, groups, and individuals impacted by company's actions. It encompasses hiring practices, working conditions, philanthropy, community involvement . . .

On a scale of 1 to 5 (5: Great Extent, 4: Considerable Extent, 3: Moderate Extent, 2: Some Extent, 1: Not at All), rate the following statements as they apply to your company:

11. To what extent does your company collaborate with other companies and organizations in industry associations to address:
    a. Environmental sustainability issues in the supply chain
    b. Social sustainability issues in the supply chain
12. To what extent does your company encourage its suppliers to recruit persons from under represented, vulnerable, or under-privileged social groups (e.g., minorities, women, persons with disabilities)
13. To what extent does your company monitor its suppliers' performance on:
    a. Environmental sustainability issues
    b. Social sustainability issues
14. To what extent does your company set standards for its suppliers for:
    a. Environmental sustainability (e.g., air pollution, water usage, deforestation and climate change)
    b. Social sustainability (e.g., hiring practices, working conditions, community involvement)

15. To what extent does your company reward (bonuses, preferences, increased business. . .) its suppliers for:
    a. Meeting or exceeding our environmental sustainability standards (air, water, deforestation, climate change. . .)
    b. Meeting or exceeding our social sustainability standards (hiring practices, working conditions, community involvement. . .)
16. To what extent does your company require its suppliers to cascade its standards and requirements to their own suppliers for:
    a. Environmental sustainability
    b. Social sustainability
17. To what extent do legal and regulatory requirements drive your company's policies, practices, and actions on
    a. Environmental sustainability in the supply chain
    b. Social sustainability in the supply chain
18. To what extent do your company's policies, practices, and actions on environmental sustainability in the supply chain contribute to:
    a. Improved operational performance (e.g., improved quality, on-time delivery, speed to market)
    b. Improved reputational performance (e.g., better company image, more effective marketing/advertising, better relationships with external constituencies)
    c. Improved financial performance (e.g., increased sales/market share, lower costs, higher profitability)

d. Improved environmental performance (i.e., better ranking and public recognition)
e. Improved social performance (i.e., better ranking and public recognition)

19. To what extent do your company's policies, practices, and actions on social sustainability in the supply chain contribute to:
    a. Improved operational performance (e.g., improved quality, on-time delivery, speed to market)
    b. Improved reputational performance (e.g., better company image, more effective marketing/advertising, better relationships with external constituencies)
    c. Improved financial performance (e.g., increased sales/market share, lower costs, higher profitability)
    d. Improved environmental performance (i.e., better ranking and public recognition)
    e. Improved social performance (i.e., better ranking and public recognition)
20. To what extent does your company's policies, practices, and actions on environmental sustainability throughout the supply chain contribute to its own environmental performance as measured by:
    a. Calvert Social Index
    b. Corporate Responsibility Officer (CRO)
    c. Ethisphere
    d. Dow Jones Sustainability Index (DJSI)
    e. The Carbon Disclosure Project (CDP)

f. Other (specify)

21. To what extent does your company's policies, practices, and actions on social sustainability throughout the supply chain contribute to its own social performance as measured by:

    a. Calvert Social Index

    b. Corporate Responsibility Officer (CRO)

    c. Ethisphere

    d. Dow Jones Sustainability Index (DJSI)

    e. FTSE 4 Good

    f. Other (specify)

22. Does your company issue an annual report on its actions and performance on:

    a. Social sustainability issues

    b. Environmental sustainability issues

Please answer each of the following open-ended questions in the space provided below

23. What are the major benefits and challenges to environmentally sustainable supply chain management? How can the challenges be overcome?

24. What are the major benefits and challenges to socially sustainable supply chain management? How can the challenges be overcome?