THE GREENING OF THE WAREHOUSING INDUSTRY IN ONTARIO-

AN ANALYTICAL STUDY OF THE EXTENT OF PRESENT DAY ENVIRONMENTAL

SUSTAINABILITY PROGRAMS

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Abstract

The Greening of the Warehousing Industry in Ontario-

An Analytical Study of the Extent of Present Day Environmental Sustainability Programs

Master of Applied Science 2016

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The purpose of the paper is to explore the extent to which the Ontario warehousing industry has embraced environmental sustainability within its business strategy. This will provide a needed baseline on the current state of practice in the Province. This could also lay the foundation for future work in Ontario, particularly with respect to where improvements can be made.

Data was collected through a review of *Leonard's Guid*e, a content analysis of publicly available information, and a survey of warehousing companies in Ontario. Multiple methods of collecting data were utilized for triangulation and to protect against the possibility not enough data would be available by one alone.

The findings indicate that there have been some inroads made in implementing environmental sustainability programs within the warehousing industry of Ontario, but there is still room for improvement. The findings also indicate that third-party logistics (3PL) are more likely than warehousing/distribution companies to implement environmental sustainability programs, as are companies which had their trade areas beyond the borders of Canada.

Acknowledgements

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1: Introduction

1.1 Overview

Over the last few decades, environmental sustainability has become an important business strategy for many companies. The notion of environmental sustainability has been interpreted in many different way by different companies. For the purpose of this thesis, the definition used for environmental sustainability is based on that which was quoted by Daly (1990); "harvest rates should equal regeneration rates (sustained yield), and that waste emission rates should equal the natural assimilative capacities of the ecosystems into which the wastes are emitted. Regenerative and assimilative capacities must be treated as natural capital, and failure to maintain these capacities must be treated as capital consumption, and therefore not sustainable" (Daly 1990: 2)

The reasons for moving towards environmental sustainability are numerous and vary from company to company. Different authors have framed the motivation in different ways. For example, some key motivations include: government regulations, changing consumer demands and the development of certification standards (Murphy and Poist 2003: 122). Bansal and Roth (2000) articulate three key reasons why companies "go green": competitiveness, legitimation, and ecological responsibility. Other potential motivations are widely discussed in the academic literature.

The issue of accountability, closely related to legitimation, is frequently cited in the non-academic literature. In a 2009 interview included in the McKinsey Quarterly, Adam Werbach stated that, "society increasingly holds global businesses accountable as the only institutions strong enough to meet the huge long-term challenges facing our planet" (Werbach 2009). He also discussed the need for a company to fully embrace the ideology of environmental sustainability in all aspects of its business. Not only would this be effectual in an environment of limited resources, but it would also allow the company to sustain its survival (Werbach 2009).

  As companies advance in their initiatives for environmental sustainability, they are increasingly recognizing a need to move beyond the boundaries of their own firm (Seuring and Gold 2013:2). This has lead more and more companies to focus on the environmental sustainability of their supply chains. Supply chains have many different definitions (Mentzer et al. 2001:3), but for the

purposes of this thesis the following definition is used. A supply chain is, "a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer" (Mentzer et al. 2001:4).

Building the issue of environmental sustainability into supply chain has also resulted in a number of different definitions of green supply chain management (Ahi and Searcy 2015:360). Whatever the definition, the key is that environmental considerations become embedded into a company's supply chain management practices. As companies have begun to focus on environmental issues in their supply chains, players within these supply chains have felt the pressure to participate in these initiatives as well (Cottrill and Blanco 2012). One group of such players has included those involved in logistics and warehousing. Logistics focuses on, "a planning orientation and framework that seeks to create a single plan for the flow of products and information through a business" (Christopher 2016), whereas the function of warehousing, "is to store goods for the time they will be needed" (Kardar et al. 2011)

Much research on sustainability and environmental impact has been done in these fields. In the last sixty years research has evolved from specific elements of the supply chain to a more encompassing scope. As McKinnon et al. (2015) explain, in the area of logistics the field has, "developed as an academic discipline, extending its original focus on the outbound movement of finished products (physical distribution) to companies' entire transport, storage and handling systems (integrated logistics) and then to the interaction with businesses upstream and downstream (supply chain management)" (McKinnon 2015:8). In accordance with this expanding scope, there is a rapidly growing body of research in green supply chain (Srivastava 2007), more broadly, and green logistics (McKinnon et al. 2015), more specifically.

Most of the original, environmental research in logistics, has been done in the area of transportation, as it is the largest annual contributor to GHGs, within the supply chain. Green transportation has been studied from a number of perspectives. For example, McKinnon et al.2015; Woodburn and Whiteing 2015; Pamučar 2016; and Figliozzi 2010; have all conducted research in this area. The focus on transportation makes some sense given that fifty-seven percent of GHG emissions, attributed to logistics, comes from road transport (World Economic Forum 2009:8). It is easy to understand why much work has been done on making transport

fleets 'greener', through effors such as changing truck routes to optimize gas efficiency and effectively positioning distribution spaces in more central locations.

The rise in research related to environmental sustainability in warehousing emerged at the end of the 1990s and throughout the early 2000s. Much of the research focused on studies in the UK, mainland Europe, Japan and the US. The topic gained importance and relevance when the *International Journal of Physical Distribution and Logistics Management* (Vol. 25 No. 2) devoted a special issue to the topic (Murphy and Poist, 2003:122).

However, a review of the literature has highlighted that there has been very little research done on the impact of environmental sustainability in warehousing in the Canadian market. There has been even less research done on the extent to which environmental sustainability has made inroads in logistics and warehousing in the Ontario market. This is an important gap given that Ontario is the largest contributor to GDP in warehousing and logistics as well as the largest player in the Canadian market. Moreover, research has shown that national culture matters in sustainability-oriented issues and that research from one context may not necessarily directly apply to another (Moon and Matten 2008).

1.2 Purpose and Research Objectives

The purpose of the research is to explore the extent to which the Ontario warehousing industry has embraced environmental sustainability within its business strategy. This will provide a needed baseline on the current state of practice in the Province. This could also lay the foundation for future work in Ontario, particularly with respect to where improvements can be made. With that in mind, the research will study the types of programs that are presently in place, and determine the opportunities.

The purpose is supported by six key research objectives:

OBJ-1. Determine the percentage of Ontario's warehousing companies that have an environmental sustainability program in place.

OBJ-2. Determine how deeply the environmental sustainability programs are entrenched within the companies' business strategies.

OBJ-3. Determine the most common environmental sustainability programs found in the warehousing industry.

OBJ-4 Determine if the trade area of a company, impacts the likelihood of having an environmental sustainability program.

OBJ-5. Determine if the size of the warehousing company impacts the likelihood of having an environmental sustainability program in place.

OBJ-6. Determine if the business classification of the company impacts the likelihood of having an environmental sustainability program.

1.3 Thesis Organization

The thesis is organized as follows:

- Chapter 2 provides a summary of relevant literature. It defines environmental sustainability and gives a historical development of the concept and how it's impacted the supply chain, both domestically and globally. It also defines warehousing, describes the changes that have occurred in the warehousing industry and describes why it has become important to 'green' that sector of the industry. The chapter closes with a discussion of the motivation for research.

- Chapter 3 describes the methodology used to conduct the study. It describes the process to gather and analyze the research data. There is also an explanation of the challenges and obstacles that came about with the data collection and what was done to overcome those challenges.

- Chapter 4 will discuss the results of the research as well as the additional information that was collected to support the objectives. There will also be a summation of the state of warehousing as it applies to environmental sustainability.

- Chapter 5 will conclude with the key findings, how these findings contribute to the academic literature and recommendations for future work.

Chapter 2: Literature Review

2.1 Defining Sustainability

In this thesis, the focus is on environmental sustainability. However, it is important to understand that sustainability is often viewed as being broader than environmental issues. In order to fully understand the statement, "sustainability means more than green" (Werbach 2009), one needs to define the broader concept of 'sustainability'.

The concept of sustainability is not a new one. From as far back as the seventeenth century philosophers and economists have been stating that humans are, "subject to the same domain as all other objects and beings and governed by the same laws (Kober 2013). Serious concern with environmental degradation began to take hold in the 1960s. The degradation was from activities over the past many decades which included: industrial development, increases in consumption, population growth and the poor management of resources (Kopnina and Shoreman-Ouimet 2015). The growing concern over environmental issues lead to a number of international initiatives. Most prominently in 1987 the World Commission on Environment and Development released the Brundtland Report. The authors defined sustainability as, "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987:24). This definition is the most widely used definition of sustainability today, but a number of other definitions have been offered over the years.

In 1990, Herman Daly, considered one of the pioneers of ecological sustainability, defined sustainability based on three elements: renewable resources, pollution and non-renewable resources (Daly 1990). He stated that- the harvesting of renewable resources; should not exceed the rate of regeneration; waste generation rates should not exceed assimilative capacity of the environment and the depletion of non-renewable resources should be balanced with the development of renewable substitutes for that resource (Daly 1990). This definition can be summarized as focusing sustainability on the rate of depletion of renewables, waste generation and use of non-renewable resources that will continue indefinitely. The issue arises that, "sustainable growth should be rejected as a bad oxymoron. The term of sustainable development is much more apt" (Daly 1990:1).

In a similar vein, biologists and ecologists have used the term 'sustainability', "when describing the rates of which renewable could be extracted or damaged by pollution without threatening the underlying integrity of ecosystems" (Vos 1997:335). This is the link to the environment that is so important. When defining 'environment', the Merriam-Webster dictionary describes it as, "the complex of physical, chemical and biotic factors (as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival" (Merriam-Webster Dictionary 2015). The combination of the two defines 'environmental sustainability'.

More recent definitions have tended to underline that sustainability is broader than just environmental issues. Sustainability is often interpreted to consist of three "pillars": environmental, economic, and social issues.

Figure 2.1 illustrates this.

Figure 2.1 The three pillars of sustainability (Rodriguez et al., 2002, p. 22)

The three pillar model of sustainability has been particularly influential in a corporate context. In 1998 John Elkington talked about the 'triple bottom line' and argued that social justice, economic prosperity and environmental quality –the three key elements of this triple bottom line –will be the yardsticks against which corporate performance will be measured (Elkington and Rowlands 1999:1). However, the exact meaning of sustainability in a corporate context has continued to be widely debated.

Curran (2009:6) stated that sustainability is, "a destination that we aspire to reach with the selection of the sustainable pathways that we choose as we proceed along the journey". The journey that a company decides to choose can vary and is, "rarely contained within a single resource area or within a single product's life cycle. Instead, they require longer term strategies that extend across geographic regions and timeframes" (Curran 2009:6). Figure 2.2 depicts, "the challenge of expanding our focus from process to ecosystem and incorporating the life cycle in the quest for sustainability" (Curran 2009:6). Fiksel (2010) described it as, "the expanding scope of corporate sustainability concerns has gradually led to a broader scope of environmental assessment—going beyond the process or facility fence line to the full range of enterprise and supply chain operations" (Fiksel 2010:29). Bakshi and Fiksel (2003) described it as, "the rethinking of approaches to economic analysis of natural systems" and "a new school of 'ecological economics' has emerged in which ecological and social capitals are valued together with conventional capital as part of a larger 'industrial ecosystem'" (Bakshi and Fiksel 2003:1351).
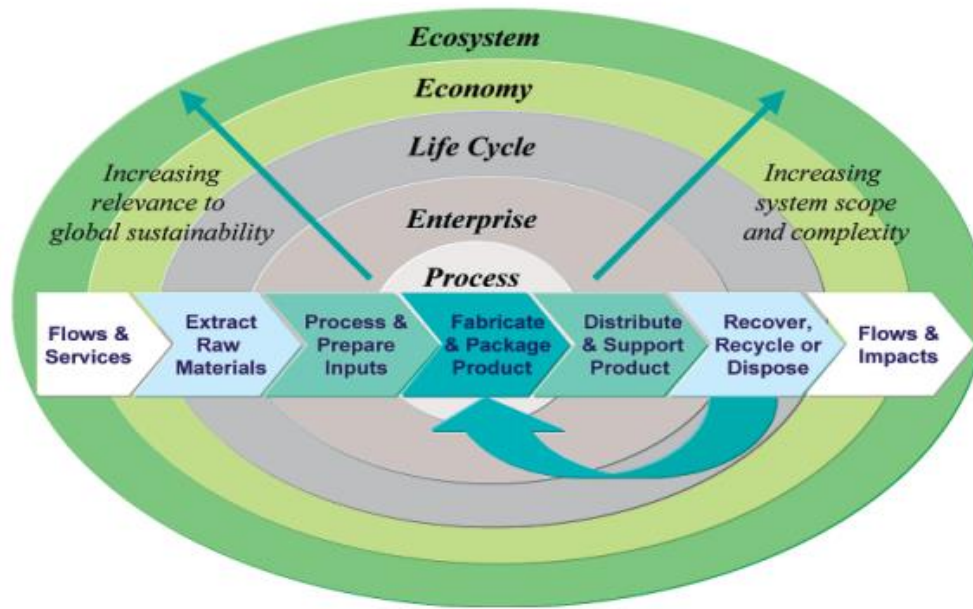
Figure 2.2 Expanding the boundaries of sustainability (Bakshi, 2003, p.1351)

Hart (1995) and Starik and Rands (1995) stated that, "unfortunately, the macro-economic, societal definition of sustainability is difficult for organizations to apply and provides little guidance regarding how organizations might identify future versus present needs, determine the technologies and resources required to meet those needs, and understand how to effectively balance organizational responsibilities to multiple stakeholders such as shareholders, employees, other organizations in the supply chain, and broader stakeholders including society and the natural environment" (Carter and Rogers 2008:363).

Most companies, base their business decisions on creating an efficient operation from a material, energy and cost perspective. Companies cannot simply focus on the financial sustainability of their business, but must take into consideration the, "broader context of general business; corporate social responsibility" (Curran 2009:9). As a result, companies have begun to adjust how they design, produce and deliver their products or services. They have also, "recognized the path towards sustainability requires life cycle thinking and the co-operation among various stakeholders throughout the life cycle of products and services" (Curran 2009:10).

2.2 Environmental Sustainability within the Supply Chain

Over the last few decades, a growing number of companies have undertaken efforts to green their supply chains. The term 'green', as defined within the context of corporate environmental sustainability describes the idea, "that the current generation should live in a way that does not impact future generations' ability to live as well, if not better than presently" (Courzon et al. 2001:1). 'Green' refers to the need to address environmental impacts, "in a socially responsible manner" (Murphy and Poist 2003:122). How this can be done in a supply chain context has been debated in the academic literature.

'Supply chain' is defined as the process which integrates, co-ordinates and controls that movement of goods and materials and information from supplier to consumer (Emmett 2004; (Raghuram and Jayaraman 2011:19). The APICS Dictionary says that the supply chain consists of two components: "the process from the initial raw materials to the ultimate consumption of the finished product linking across supplier-user companies, and the functions within and outside a company that enable the value chain to make products and provide services to the customer" (Lummus and Vokurka 1999:11). A number of authors have broadened the concept of supply chains to include reverse supply chains, which focus on product recovery, reuse, remanufacturing, recycling, and disposal. Originally it was described by Lambert and Stock (1981) as, "going the wrong way on a one-way street because the great majority of product shipments flow in one direction" (Lambert and Stock 1981:19).

Rogers and Tibben-Lembke (1999) define it as "the process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from point of consumption to the point of origin for the purpose of recapturing value or proper disposal" (Srivastava 2007:55). As further explained by other authors, "essentially the challenge today is to create a 'closed loop' supply chain that will enable a much higher level of reuse and recycling" (Christopher 2016:258).

The concept of a 'green supply chain' merges the concept of environmental sustainability and supply chain. There is environmental thinking with the reduction of environmental impacts at every stage of the supply chain (Raghuram and Jayaraman 2011:23-24) and encompasses all the different phases of a product's life, "from the extraction of raw materials, through the design, production and distribution phases, as well as the use and final disposal" (Insight 2008:9). The

result is a horizontal activity flow that, "seeks to optimise the management of information flows, physical flows and interfaces between producers and suppliers that are involved in the production of the product/service" (Insight 2008:9). If the product life cycle is considered in its entirety than the traditional linear model gives way to a cyclical model as it takes into consideration all the players (Insight 2008:9).

There are a number of definitions of green supply chains in the literature (Ahi and Searcy 2015). For example, Zhu and Sarkis (2004) state that the definition and scope of green supply chain management in literature has ranged from green purchasing to integrated green supply chains flowing from supplier to manufacturer to customer, and even reverse-logistics (Zhu and Sarkis 2004:267). Srivastava (2007) defines a green supply chain as, "integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life" (Srivastava 2007:54-55). Sustainable supply chains have also been widely defined with some authors emphasizing the pre-eminence of environmental issues in the concept (Montabon et al. 2016).

The literature on green and sustainable supply chains is rich and growing. A number of literature reviews have been done that summarize the state of academic work in these areas (Carter and Rogers 2008; Hassini et al. 2012; Seuring and Mueller 2008; Srivastava 2007; Bowen et al. 2001; Abukhader and Jonson 2004; Rao and Hol, 2005; Koplin et al. 2007). The research shows that definitions, motivations, measurement, reporting, and best practices in green and sustainable supply chains have all been widely studied. However, much of the research is theoretical in nature. There are also questions on the extent to which the practices advocated in the literature have been applied in Ontario.

There is evidence that companies are increasingly considering green issues as a part of their supply chain activities.

To understand the importance of green supply chain strategies in the corporate world, a survey done in 1995 on 133 US firms indicated that, "61 percent had a 'formal or written environmental policy and almost three-quarters had been introduced since 1980" (McKinnon 2010:13).

When focusing on the reasons why companies implemented these environmental policies, there was as much focus placed on, "enhancing sales, market share and exploiting new market opportunities that would lead to greater profit margins, as it did to achieving cost savings and a general want to do what's best for the environment" (McKinnon 2010:14)

Table 2.1 refers to three separate studies that were done over a span of a few years. All three were of different sample sizes, composed differently and of different methodologies. Even with the differences, common reasons for implementation were realized.

It is interesting to note that all three reports make no mention of protecting the environment. As a representative example, one of the studies explains that, "government regulations, changing consumer demands, and the development of international certification standards were some of the responses to environmentalism at the start of the twenty-first century", (Melnyk et al. 1999:36). The assumption is that all the elements of a green strategy would support the company's economic activity for an extended period of time (McKinnon et al 2015). Activities considered straddling the environmental supply chain and economic bottom line have been listed as: reduction in packaging, proactive shaping of future regulations, reduced health and safety costs due to safer warehousing and transportation, reduced costs, shorter lead times and better product quality from implementing ISO 14000 standards and gaining an enhanced reputation. All these demonstrate the relationships of environment, social and economic performance within the supply chain management context (Carter and Rogers 2008).

Table 2.1 Key drivers for the greening of logistics and supply chains and the percentage of companies mention the driver

Eyefortransport (2007)	Aberdeen Group (2008)	Insight (2008)
'Key drivers for instigating green transport/logistics'	'Top five pressures driving the green supply chain'	'Main drivers for green logistics'
Improving public relations (70%)	Desire to be thought leader in sustainability (51%)	Optimize logistics flow (18%)
Improving customer relations (70%)	Rising cost of energy/fuel (49%)	Improve corporate image (16%)
Part of their corporate responsibility agenda (60%)	Gaining competitive advantage/differentiation (48%)	Reduce logistics costs (15%)
Financial return on investment (60%)	Compliance with current/expected regulation (31%)	Achieve regulatory compliance (15%)
Government compliance (60%)	Rising cost of transportation (24%)	Satisfy customer requirements (14%)
Decreasing fuel bills (60%)		Differentiation from competitors (11%)
Increasing supply chain efficiency (55%)		Develop alternative networks (10%)
Decreasing risk (50%)		
Improving investor relations (38%)		

McKinnon et al, 2015

2.3 Impact of Globalization on Supply Chain

Globalization has created networks of companies that can no longer shield themselves from environmental risks and societal expectations. "We have evolved from a world of isolated, individual nations and societies, to a much more globally interconnected world, cultural and other differences among societies tend to become increasingly mitigated" (Achilles and Elzey 2013:3). Companies within a supply chain are seen as arm's length extension of companies that have placed a high significance on environmental responsibility (Montiel and Delmas 2009; Fawcett et al. 2006). As a result, many companies that have considered themselves environmentally conscious and have environmental programs entrenched into their business

strategies have begun to pressure companies within their supply chain to do the same. It has been argued that to be considered a truly 'green' company, a company must employ, "the use of practices, principles and policies in order to provide a product that will positively affect the environment" (Envirotools 2015). "Real supply chain management cannot deliver exceptional value without the highest level of managerial commitment both within their companies as well as up and down the supply chain" (Fawcett et al. 2006:25-26).

The growing practice of rating the sustainability performance of companies may help in selecting sustainable supply chain partners. The need to select such partners is particularly pressing given the global nature of many supply chains. There are a now hundreds of ratings available. Corporate Knights and HIP (Human Impact and Profit) Investor Inc. offer two examples of organizations that rate companies based on their sustainability and environmental impact.

The Global 100 qualifies companies based on; sustainability disclosure, Piotroski F-score (an accounting based fundamental analysis), product category and sanctions (how much a company has paid out in sustainability related fines/penalties or settlements). Based on this, the companies that scored the highest included: BMW (Germany), Dassault Systems (France), Outotec (Finland), Commonwealth Bank of Australia (Australia) and Adidas (Germany). When looking at the ranking that was done by HIP, the top ranked companies were: Biogen (US), SHIRE Plc (Ireland), Allergen (US), Reckitt Benckiser Group Plc (UK) and Adobe Systems Inc. (US) These companies have been ranked by analysing their future risk, return potential and the net impact they have on society (HIP Investor 2016). Companies were measured against their: combined energy productivity, combined greenhouse productivity, combined water productivity, combined waste productivity, green revenue score, green pay link, sustainability board committee and audited environmental metrics. The analysis that is done in the HIP ranking emphasizes the environmental factors more so than the ranking of Corporate Knights. Unfortunately, it can be seen that there is no real consistency with how companies are ranked or what the standard description of true sustainability really is. This may be due to differing interpretations of sustainability and may be limited by the type of data that is currently available.

Montiel and Delgado-Ceballos highlighted in one of their studies that, although there seems to be some agreement on how to measure the environmental dimensions of corporate sustainability, it is unclear how the economic and social dimensions can be best measured (Montiel and

Delgado-Ceballos 2014; Raghuram and Jayaraman 2011). It has even been argued that some ambiguity around the concept of 'sustainability' is, helpful because it facilitates conversation and collaboration among diverse groups and social worlds. The question becomes then: Is it sustainable to keep supply chain as a metaconcept without a standardized definition and measurement method? (Ansell 2011; Montiel and Delgado-Ceballos 2014). Most of the studies that Montiel and Delgado-Ceballos found for their literature review was analysis done revolving around the three pillars: economic, social and environmental (Montiel and Delgado-Ceballos 2014).

Their conclusion from their study, was that it would be beneficial to have a process, "through which nonfinancial information (sustainability data, including social and environmental data) can become part of the core business, and through which a standardized system of nonfinancial performance accounting and reporting can evolve…in essence, the construct of 'sustainability balance sheets and statements' which will allow us to objectively value firms' nonfinancial performance, and to compare firms and sectors" (Montiel and Delgado-Ceballos 2014:133).

2.4 The Importance Warhousing in Green Supply Chains

Warehousing is defined as, "performance of administrative and physical functions associated with storage of goods and materials. These functions include receipt, identification, inspection, verification, putting away, retrieval for issue, etc." (BusinessDictionary.com 2015). Today's warehousing has been significantly altered from its original usage, when it was seen as strictly storage and retrieval. The 1990s saw an emergence of new practices: the centralization of inventory, Just-In-Time replenishments (JIT) which, "has supported 'zero-stock' as a basic and strategic pillar" (Manzini 2012:vii) and a wider sourcing of suppliers. There have been arguments regarding the pros and cons of all these new practices as well. The belief of having a centralized location was beneficial since there was not the duplication of resources in smaller, more dispersed warehouses around an area. JIT delivery was considered more economical since: money was not tied up in inventory, smaller warehouses were required, lowered overhead costs, created an intensification of usage and required less employees for maintenance and running of the facilities (Baker and Marchant 2010). The 2000s brought about more shifts in warehouse practices due to on-line shopping with: e-fulfillment

centres, urban consolidation warehouses for shopping centre deliveries and port-centric import warehouses. E-fulfillment centres work independently of specific companies where orders are outsourced for the purpose of fulfilling customer orders. Urban consolidation warehouses are, "logistics facilities that are situated in relatively close proximity to the urban centre they serve, which can include: a city centre, an entire town, a shopping centre, airport, hospital or major construction site" (Browne et al. 2011:1).

Warehouses, and the broader logistical function of which they are a part, play a critical role in many supply chains. They have a number of key impacts that can influence the overall environmental sustainability of the supply chain.

2.4.1 The Economic Contribution of Logistics and the Warehousing Industry

As McKinnon (2010) explains, "Logistics is widely used to describe the transport, storage and handling of products as they move from raw material source through the production system to their final point of sale or consumption" (McKinnon 2010:3). The costs associated with logistical activities vary from supply chain to supply chain. However, a number of authors have highlighted that a large portion and cost of the supply chain for many companies is logistics (Engblom et al. 2012) For example, in the studies done by Engblom et al. (2012) and Song and Wang 2009, they stated that logistics exceed 10% of cost in company turnover. These costs include: "transport, warehousing, inventory carrying, logistics administration, transport packaging, and indirect costs of logistics" (Engblom et al. 2012:1).

Globally, the logistics market was valued at $4 trillion in 2013 and translated into approximately 10 percent of global Gross Domestic Product (GDP) (Evotech Capital 2014). The global explosion in trade over the last 20 years relates back to the, "innovation in logistics and the changes in policies in countries around the world which have reduced the costs of shipping goods and services across borders" (Evotech Capital 2014:3).

In Canada, the transportation and warehousing industry accounts for approximately 5.6 percent of GDP for a total of $68.1 billion (Industry Canada 2015). It is ranked tenth of 18 industrial sectors (Industry Canada 2015). Ontario accounts for $22.2 billion of the Canadian total, and is ranked ninth of 20 industrial sectors in the province (Ontario Ministry of Finance 2016). Ontario

accounts for the largest portion of the transportation and warehousing industry in Canada due to its: proximity to the US, the size of its population, the transportation infrastructure, the amount of manufacturing that is still present in the province and the value added that is placed on products within those manufacturing sectors (Hamilton Economic Development, 2007 – 2013; Canadian Shipper.com, 2015). At present, most large companies that deal in shipping/receiving, retailing and manufacturing still maintain warehouse facilities in Ontario to allow for product to be shipped to major centres in Canada, the US and abroad.

2.4.2 Environmental Impacts Attributed to Logistics and Warehousing

Logistics and warehousing have a number of environmental impacts. The impacts can be broken down into three categories: transportation, warehouse operation and warehouse construction (University of California- Berkeley 2013). All three contribute to giving off CO_2 emissions, with transport being the highest contributor. With respect to warehousing processes, they would include, "direct energy usage, the emissions produced (primarily carbon dioxide), water consumed and embedded energy used, regardless of source (oil, gas, fossil-generated electricity) or method of generation" (Baker and Marchant 2010:195). Thirdly, warehouse construction accounts for substantial energy consumption during the construction phase (University of California- Berkeley 2013). In US and UK studies done in 2008, it was determined that, "the growth in electricity consumption and energy for all commercial property is closely coupled to the rate of or increase in total floor space" (Baker and Marchant 2010:196). With increasing sizes of warhousing, and the capital investment in these buildings, "it has resulted in a substantial increase in the intensity with which the warehouses are operated under in order to achieve a faster payback and reduce fixed costs" (Baker and Marchant 2010:198). The intensification has also been increased by, "retailers moving to longer trading periods, JIT production, moves to e-fullfillment and online retailing. Warehouses are now expected to work two or three shifts per day, six to seven days a week" (Baker and Marchant 2010:198; Baker and Perotti:2008).

 Given the growing corporate and societal awareness of climate change, GHG emissions are an issue of particular importance in these contexts. In fact, the World Economic Forum recently identified climate change as the number one risk in its *Global Risks Report 2016* (WEF, 2016).

In an earlier World Economic Forum study (2009), it was estimated that 2 800 mega-tones of GHGs or 6 percent of the total, global greenhouse gas emissions can be attributed to the logistics and warehousing sector (World Economic Forum 2009). Figure 2.3 depicts the breakdown of the logistics sectors and their global GHG contributions.

Figure 2.3: GHG emissions from global logistics and transport activities.
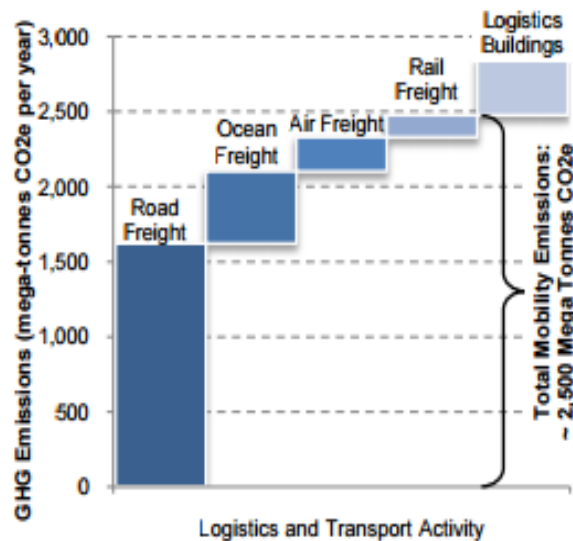
World Economic Forum, 2009, p. 8

The most recent data for Canada's total GHG emissions equaled 726 mega-tones (Mt) (Environment Canada 2015). Of this total, Ontario was the second largest contributor after Alberta to GHGs at 23.5 percent (Environment Canada 2015). In Ontario's Climate Change report for 2014, much was lauded about the decrease in overall GHG emissions, but two industries saw an increase: transportation and buildings. Transportation accounted for 34 percent and buildings accounted for 17 percent of emissions (Ministry of the Environment and Climate Change 2014). There were no figures that specified the percentage of GHG emissions that can be directly attributed to warehousing, in either Canada or Ontario. However, given the large emissions associated with transportation and buildings, including (but not limited to)

warehouses, there is a need to better understand the extent to which environmental sustainability has been embedded in these areas.

Figure 2.4 Evolving perspectives and themes in green logistics
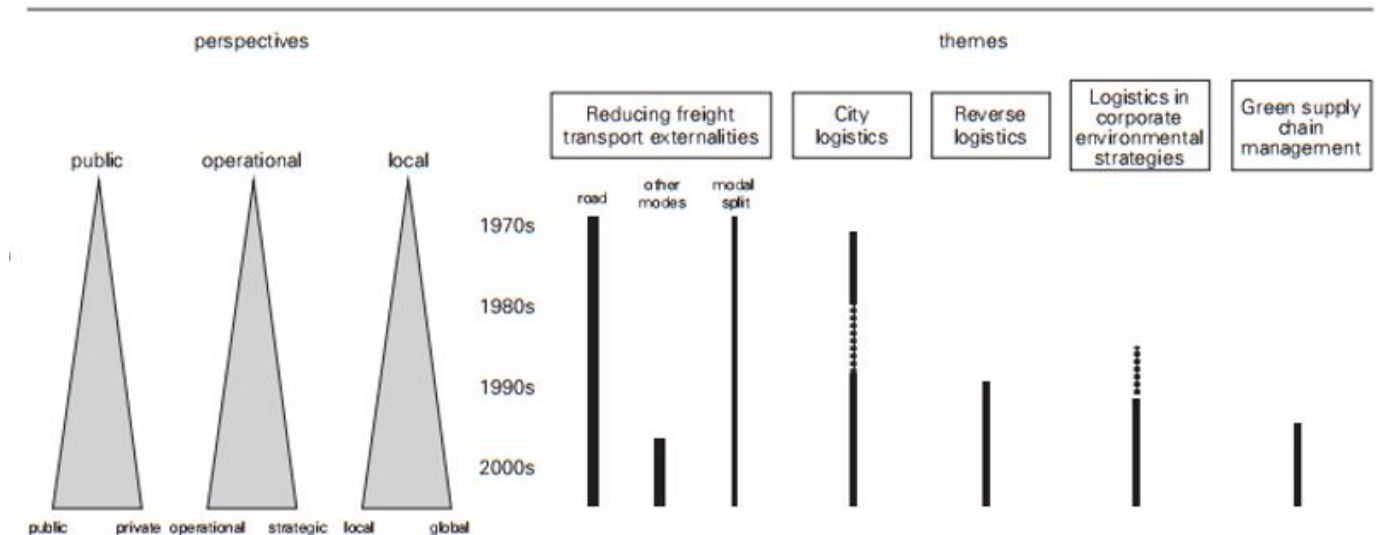
Source: McKinnon, 2010, p. 6

2.4.3 The Foundation of Research in the Warehousing Industry

As previously explained, the scope of research on supply chain management has expanded dramatically over the past several decades. This includes a deepening of research in the logistics and warehousing industry. Although there is relatively little literature on green warehousing, there is a considerable body of research on the broader area of green logistics. Figure 2.4 provides an overview of the evolution of research on green logistics since the 1970s.

Figure 2.4 presents the merging of topics, in environmental perspectives for green logistics. The topics have included: the reduction of freight transport externalities, city logistics, reverse logistics, logistics in corporate environmental strategies and green supply chain management. These categories were taken from a study by Abukhader and Jonson in 2004. The lines depict the amount of research that has been done based on the topic. Reducing road freight externalities

has been the most researched topic since the late 1960s. Modal splits has also been researched since the late 1960s, but not as heavily. City logistics has had a split in research, occurring within the 1980s and 1990s, after which point it was once again researched more heavily. Reverse logistics, corporate environmental strategies and green supply chain management have been fairly recent areas of research. These topics only began to be seriously studied from the mid-1980s. The wedges depict the, "tentative chronology for research activity on these topics and depicts three more general trends that have, since the 1960s, altered the context and priorities of research. These are shown as wedges to reflect a broadening perspective" (McKinnon, 2010).

The first wedge depicts the movement in research from public to private. Most of the research in the 1960s and 1970s was public policy driven. As the public sector began to become more involved in green logistics, business was now formulating the strategies and driving policies that would affect logistics.

The second wedge depicts, "the broadening of the corporate commitment to green logistics, from the adoption of a few minor operational changes, to the embedding of environmental principles in strategic planning" (McKinnon, 2010:6). For example, what would be considered a minor operation- a transport company might tell its drivers to obey the speed limit and limit idling time. In a more strategic plan, the company would be SmartWay certified; its drivers would have to have extensive training and certification in the program, keep a log of their mileage and haul weights, and the company would have an audit procedure of its drivers in place.

The third wedge depicts how research has moved from a very local, environmental perspective, to a global perspective. This has been influenced with a greater understanding as to how local environmental impacts have an effect on the global problem of climate change.

The rise in research of environmental sustainability in warehousing emerged at the end of the 1990s and throughout the early 2000s. It was mostly researched in the UK, mainland Europe, Japan and the US. As noted in the introduction, a high point in research in this area occurred in 1995 when the International Journal of Physical Distribution and Logistics Management (Vol. 25 No. 2) devoted a special issue to the topic (Murphy and Poist, 2003). One of the key points in the research to date is that different companies approach the environmental sustainability in warehousing in different ways. This may be partially explained by the different governance

frameworks and cultures in different countries, but it is important to note that practices can be different for companies working in the same country.

For example, consider the study done by Murphy and Poist (2003), on "comparative logistics" that referred to, "comparing and contrasting of logistics systems, practices and perspectives" (Murphy and Poist, 2003:123). This study looked at the, "green perspectives and practices of US vs non-US (Canadian and European) firms, with regards to environmental issues and strategies (Murphy and Poist, 2003:123). Their overall hypothesis was that US firms differed in terms of green activism and awareness from their non-US counterparts. Murphy and Poist based their research on a study from the Global Logistics Research Team from Michigan State University (1995). The research team found that, "European firms demonstrate high levels of environmental sensitivity" (Murphy and Poist, 2003:123) and in a study done by Carter et al. (1998), the findings were that, "German purchasing managers are much more involved than their US counterparts with respect to environmental purchasing" (Murphy and Poist, 2003:123). Cooper et al. (1994) stated that, "The European Community and Canada have been particularly active in legislation in response to public concern for the environment" (Cooper et al., 1994:123). As a result, Murphy and Poist wanted to see if Canadian and West European companies, "have adopted a more progressive approach to management of environmental issues in logistics" (Murphy and Poist, 2003:123) because of the response to government activism, in comparison to their US counterparts.

The study tested six areas. (Murphy and Poist, 2003)

1. There will be differing views towards the general importance of environmental issues.
2. Policies for environmental management will be different.
3. The reasons for establishing these environmental policies will be different.
4. There will be differing views on the importance of the established policies.
5. There will be differing views on the degree of impact that environmental issues will have on the logistics functions.
6. There will be differing strategies to manage/respond to the environmental issues.

The similarities surfaced in the answers of number one, three and six. The results indicated that the US and non-US respondents had similar views in regards to the future importance of environmental issues; that complying to government regulations and controls was the main

reason for establishing environmental policies and similar strategies were implemented in response to managing environmental issues. Differing responses prevailed with answers to propositions two, four and five. Policies for environmental management were similar, in relation to the establishment of formal procedures. The difference occurred in the percentage of US and non-US companies that had formal procedures, as well as the time lines that those procedures were implemented. Proposition five listed numerous environmental issues that the respondents had to rate for importance. The differences appeared with the ranking of certain pollutants as moderately important. Visual and odour pollution was rated more important by non-US respondents than that of US respondents. The researchers believed that the disparities were in response to the US Clean Air Act and Clean Water Act. All other environmental issues were ranked with similar results. The final proposition stated that there will be differing strategies to manage/respond to environmental issues. The US and non-US respondents replied in a similar fashion and similar strategies were put into place in response to environmental issues. Whether based on best practices within an industry or greater involvement of governments with policy implementation, the practices showed no evidence of differences.

The study above indicates that more attention is needed on studying green warehousing practices in different contexts and what factors might help explain any differences in these practices. A review of the literature showed little work that specifically applied to the Canadian or Ontario market. Although research has been done on the broader issue of sustainable supply chains (Morali and Searcy 2013; Srivastava 2007; Carter and Rogers 2008; Abukhader and Jonson 2004) there is little, if any, particular focus on green warehousing in Canada or Ontario. Most environmental studies, pertaining to warehousing, included the Canadian market as 'non-US or North American' or were based on warehouse design (Baker and Marchant 2015; Baker 2006; BNP Paribas Real Estate 2010; Dhooma and Baker 2012; Murphy and Poist 2003).

2.5 Related Studies

Table 2.2 Themes applied to warehousing and environmental sustainability related studies

Environmental Sustainability	Bansal and Roth (2000), Mueller (1991), Achilles and Elzey (2013), Bakshi and Fiksel (2003), Curzon et al. (2001)
Green Logistics	Murphy and Poist (2003), World Economic Forum (2009),
Supply Chain Management	Fawcett et al. (2006), Lummus and Vokurka (1999), Mentzer et al. (2001), Beske and Seuring (2014), Brandenburg and Seuring (2011), Vachon and Klassen (2001)
Green Supply Chain Management	Srivastava (2007), Bowen et al. (2006), Handfield et al. (2005), Montiel and Delmas (2009), Rao and Holt (2005), Sarkis (2003), Sarkis (2012), Vachon and Klassen (2006), Walton et al. (1998), (Insight 2008)
Sustainable Supply Chain	Montabon et al. (2016), Morali and Searcy (2013), Abukhader and Johson (2004), Jayaraman et al.(2007), Seuring and Mueller (2008), Seuring and Gold (2013), Seuring et al. (2008), Fiksel (2010), Curran (2009), Carter and Rogers (2008), Ahi and Searcy (2015)
Warehousing	Baker and Marchant (2015), BNP Paribas Real Estate UK (2010), Dhooma and Baker (2012), Sehnem and Rossetto (2012), Baker (2006), Macias (2013)
Third-Party Logistics	Lieb and Lieb (2009), Lieb and Lieb (2010)
Small- and Medium- Sized Companies	Lee and Klassen (2008)
Reverse Logistics	Rogers and Tibben-Lembke (2001), Carter and Ellram (1998)

2.6 Motivations for Research

It has been noted that, "when considering issues of energy intensity, carbon footprints or sustainability within the supply chain, most attention has been given to understanding and mitigating the impact of transportation. Little attention has been given to evaluating the consequences of warehousing in the supply chain" (Baker and Marchant 2010:9). Warehousing companies are becoming more aware of the impact their businesses are putting on the environment, but the question than becomes, what should a company do to mitigate those impacts? The opportunities, "go beyond the the micro-level actions for a firm and must consider the wider macro-level impacts of emissions, land use, environment and ecology" (Baker and Marchant 2010:9) As stated previously, a global supply chain study found that, "thirteen percent of supply chain emisssions emanate from logistics buildings" (World Economic Forum 2009). The problem then arises to how a business can establish an approach of how to balance long-term capital investment decisions against short-term operational savings in energy or resource consumption for a third-party (Baker and Marchant 2010). In a study done by Lieb and Lieb in 2008 and 2009 they, "documented the extent to which large third-party logistics (3PL) companies had committed themselves to environmental sustainability goals. It also aimed to examine the sustainability initiatives undertaken by those companies and the impact of those initiatives on the 3PL and their customers" (Lieb and Lieb 2010:524). The study included companies from North America, Europe and the Asia-Pacific area. The research indicated that of the 39 responding companies 28 (71%) had a formal sustainability program in place. When asked what their reasons for implementation were, they stated that; "a corporate desire to do the right thing", was ranked number one; "pressure from customers" was ranked number two and "corporate desire to enhance company image" was ranked third (Lieb and Lieb 2010:526). The highest ranking programs were all based on the their transport fleets, with partnering with the government agency and implementing SmartWay ranking in the top four initiatives (Lieb and Lieb 2010). "The 'other' category contained a number of interesting initiatives, including efforts to reduce company-printed materials, recycle office supplies and packaging materials, install solar panels in warehouses, promote company use of leadership in energy and environmental design warehouses" (Lieb and Lieb 2010:527). The installation of energy-efficient lighting, motion sensors and implementing a recycling program were the most popular initiatives. With

this in mind: **Objective 1**- Will determine the percentage of Ontario's warehousing/third-party logistics companies that have an environmental sustainability program in place

 "Much of the environmental innovation in products and processes reportedly has been stimulated either by government regulation or by what has been loosely labeled as market demand" (Howes et al. 1997:5). As explained in another study, market demand is closely associated with customer needs and wants: "Customers are often stimuli for focused improvement for SME suppliers within supply chains, these capabilities tend to be aligned with the requirements of customers, which frequently are large buying firms" (Lee and Klassen 2008:574). Even with pressures from stakeholders and customers, the ability or the drive to implement an environmental sustainability program for many companies is difficult. Much of the difficulty originates from the inability for upper management and executives to understand the worth and the return that an environmental sustainability program can generate. "The firm's main goal is creating wealth…the key is that economic performance is the goal, not sustainability" (Montabon et al. 2016::17).

As a result, the key to achieving desired collaborative breakthroughs is to establish strong managerial commitment to supply chain management (Fawcett et al. 2006; Akkermans et al. 1999; Lummus et al. 1998). The commitment must come not just from the worker or middle manager, who will be implementing the process, but must be implemeted and endorsed from the CEO and all top mangement (Blackwell and Blackwell 1999; Fawcett et al. 2006; LaLonde 2000; Marien 2000; Stalk et al. 1992). Senior management must also be committed to allocate enough necessary resources to ensure that an environemental sustainability program succeeds (Marien, 2000, Stalket al. 1992). The type of impact that a company wishes to make will also be based on the approach it takes for implementation. Some companies will, "choose to pick what is referred to as 'low bearing fruit'-projects that can be implemented with few obstacles to success, or projects with a big impact and visible return on an investment of effort" (Robertson 2014:60) . Regardless of the project size there is also the consideration of how it will impact the larger system in which a project functions as well as in within its immediate area. Projects should, "work at mutiple scales and across various baoundaries" (Robertson 2014:60), to be successful. With this in mind: **Objective 2-** Will determine how deeply the environmental sustainability programs are entrenched within the companies' business strategies.

As stated previously, logistics accounts for over 10% of sales turnover costs for most companies. In Europe and the US, it was estimated that warehousing accounted for approximately 24% of total logistics costs (Establish 2013). It was also estimated that in the UK, 3% of total greenhouse gas emissions came from warehousing (UKWA, 2010). There were no such definitive emissions figures for Canada, nor Ontario with regards to the warehousing industry. But taking the UK percentage into consideration, warehousing costs are considerable and working to reduce those numbers are in the best interest of all supply chain members. There are numerous ways that a warehouse can reduce its energy costs and emissions. Companies have begun to make considerable capital investments in programs that will mitigate some of these costs through the following programs: reducing the amount of energy usage through temperature control, installing more energy efficient lighting, decreasing the amount of energy usage, using battery/propane powered forklifts, building LEED buildings, and harnessing green energy. Within all these groups, are numerous more detailed programs (Baker and Marchant 2010). Some of these programs are easier to implement than others, as well as quicker to implement. As a result, some programs will be more popular than others. With this in mind:

Objective 3- Will determine the most common environmental programs in the warehousing industry.

As stated previously, the motivations that companies have to implement environmental sustainability programs are listed as: government regulations, pressures from customers and other stakeholders, managing company image, competitive advantage, supplier management for risks an performance and environmental and social advocacy (Sarkis 2001; Roberts 2003; Darnell et al. 2008; Seuring and Muller 2008; Bjorklund 2011). The implementation requires all members of the supply chain to be integrated with the programs that ensure that risk management, environmental and social standards are being met, to be considered highly effective. As a result there is a need to consider the integration of both the upstream and downstream impacts (Morali and Searcy 2013). This is of particular importance when a company functions on a global level, where there is an increased demand from its stakeholders, and a higher expectation of having to be integrated to a broader supply chain. In recent years, there has been a greater push put on world nations to decrease the emissions that are created

within their borders. "The European Union's Energy Policy calls for a 20% reduction in green house emission by 2020. California's AB 32 Global Warming Solutions Act seeks to reduce emissions by 25% by 2020, and UK Climate Change Act mandates an 80% reduction in emissions by 2050" (World Economic Forum 2009:6). These are very large goals to which companies need to adapt to, in order to do business in these parts of the world.

Unfortunately, most of the time, the drivers in the supply chain are the large firms who can afford the implementation of strategic environemental programs since the intial outlay costs tend to be great (Lee and Klassen 2008). With this in mind: **Objective 4**- Wants to determine if the trade area of a warehousing company, impacts the likelihood of having an environmental sustainability program.

Many small-and- medium size enterprises (SME) suppliers have difficulty meeting the emerging environmental and social standards of their customers because of limited financial funds, lack of human resource expertise, and difficulties identifying and acting on relevant information (Lee and Klassen 2008; Moore and Manring 2009; Temomi 2010). It was also found that the return on investment was not very positive, but further study would be needed to determine the factors of impact. SMEs understand the importance of mitigating any environmental risk that is inherent in their business as well as the supply chain that they partake in (Handfield et al. 2005). Lee and Klassen (2008) have gone on to state that in their study, their findings were indicated that there has been very little research done on, "SMEs' role in improving environmental management and performance" (Lee and Klassen 2008:573). Much of the studies that have been done, have been done on green supply chain management (GSCM) of large companies (Friedman 2002). Large companies find that SME hamper the movement forward of environmental programs within their supply chains. With this in mind: **Objective 5-** Wants to determine if the size of the warehousing company impacts the likelihood of having an environmental sustainability program in place.

As stated in the objective 1, the Lieb and Lieb study looked at the programs being put in place by third-party logistics. The consideration for this industry was mostly focused on the transportation side, as it created the most carbon emission. The environmental impact of the

building and its functions have been of a more recent consideration. Much of the work has been in the field of energy and water efficiency, harnessing green energy or building a more sustainability building (Baker and Marchant, 2010). Keeping this in mind: **Objective 6-** Determines if the business classification of the company impacts the likelihood of having an environmental sustainability program.

The need to address these objectives was confirmed through a preliminary scan of environmental programs in Ontario warehousing companies. The scan was based on all the logistics and transportation companies in the *Leonard's Guide* on-line business directory, which covers thousands of companies in North America. The companies that have their names and profiles appear in this directory must pay an annual fee. In the *Leonard's Guide* the term 'logistics' included warehousing and all the various services that would be included in storing and shipping product. The on-line directory listed general information including: address size/capacity, services provided. The directory also gave a direct link to each company's website from which the environmental program information was collected. The online directory listed 189 warehousing and third-party logistics companies. All these companies were scanned to investigate what percentage had an environmental sustainability program in place. The initial scan of companies was done at a very high level to understand the extent of environmental sustainability program within the Ontario industry. The result was that only 46 (24%) companies had some type of environmental sustainability program listed. These findings underlined the need to pursue the objectives listed above.

Chapter 3: Research Methodology

The method applied in this research is summarized in Figure 3.1. As shown in the figure, the study focused on addressing the purpose and research objectives in the Ontario context. Data was collected through a review of *Leonard's Guid*e, a content analysis of publicly available information, and a survey of warehousing companies in Ontario. Multiple methods of collecting data were utilized for triangulation and to protect against the possibility not enough data would be available by one alone.

3.1 Overview of Research Method

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│ evaluation of key issues    │
│ and research problem        │
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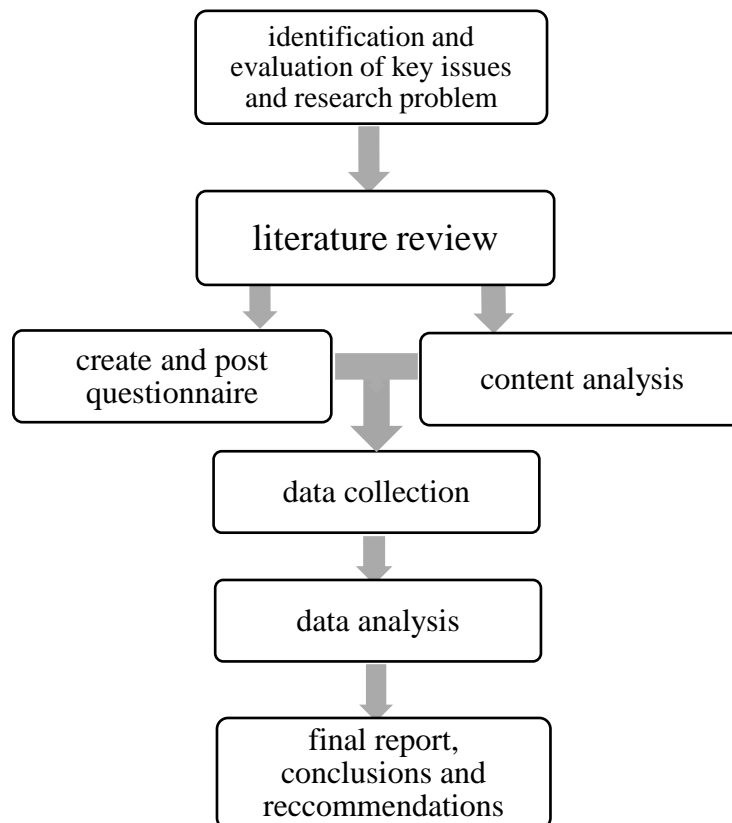
Figure 3.1: Overview of research method

Ontario was used to as the boundary for the study. Ontario is Canada's largest province, with a population of 13,792,052 (Ontario Ministry of Finance 2016), representing 38.5% (Wikipedia 2016) of the national total. It is a diversified economy, with a GDP of $747 790 (millions) which represents 37.7% of Canada's GDP (Ontario Ministry of Finance 2016). The main industries are: real estate renting and leasing, healthcare, social services and education, manufacturing, and wholesale and retail trade (Ontario Ministry of Finance 2016). Ontario's GHG emissions were 170 mega-tones in 2015, representing 23.5% of the national total (Environment Canada 2015).

Ontario announced new programs, to combat climate change, in the early part of 2016. The programs include: a cap and trade program, funding for a new Green Investment Fund and, "a new quantification, reporting, and verification of greenhouse gas emissions regulation to support the cap and trade program" (Government of Ontario 2016).

The Ontario cap and trade program, "is designed to help fight climate change, and reward businesses that reduce their greenhouse gas emissions" (Government of Ontario 2016). For those companies that, "produce more than 25 000 tonnes of greenhouse gas emissions per year, that organization is referred to as a capped emitter, and will be required to participate in the cap and trade program" (Government of Ontario 2016). They will need to register to the Compliance Instrument Tracking System Service (CITSS), "that tracks emissions allowances and offset credits from time of issue by governments, to ownership, transfers, through to final retirement" (Government of Ontario 2016).

The second program that the Ontario government has committed to is the investment of $325 million dollars to the Green Investment Fund. This money has been earmarked to be used for many public initiatives such as: helping homeowners use less energy, help install more electric vehicle charging stations, retrofit social housing developments as well as help businesses reduce the amount emissions they produce (Government of Ontario 2013). This portion of the program will receive $74 million dollars and is aimed at encouraging larger industrial plants to install emission reducing technology. The Ontario government is also investing $25 million for a SMART Green program that is aimed at small-medium sized businesses to allow them to become more energy efficient- not only through the use of environmentally friendly processes but also through the creation of new products and technologies.

The third initiative involves the implementation of a new, "quantification, reporting, and verification of Greenhouse Gas Emissions Regulation O. Reg. 143/16 made under the Climate Change Mitigation and Low-carbon Economy Act, 2016 to support implementation of Ontario's cap and trade program" (Government of Ontario 2016). Reporting will need to occur if a company, "exceeds 10,000 tonnes or more of greenhouse gases (GHGs) in a year or exceeds another reporting threshold listed in the cap and trade program" (Government of Ontario 2016), and if the company uses particular activities that emit GHGs.

The Ontario government predicts that by 2020 there will be a 15% decrease in GHG emissions from 1990 levels (Government of Ontario 2016) and is expected to generate $1.8-1.9 billion per year in cap and trade revenue that will be placed into a Green account that will be re-invested into programs that help further decrease GHG levels (Government of Ontario 2016).

3.2 Data Collection

3.2.1 Review of Leonard's Guide

The study focused on Ontario companies that were listed in 'Leonard's Guide'. Leonard's Guide is a private North American directory that is put out yearly, with the most comprehensive listing of warehouse and distribution centres, third-party logistics companies, international air cargo companies and trucking companies. The information contained in the guide includes; the business classification, the services that are provided by the company, size of warehouses the company holds, number of employees in the company and email addresses of contact personnel.

The warehousing/distribution and third-party logistics companies that were included in this study were classified as either: private or publically listed and specialized in storage of retail-ready products. Warehousing, distribution and third-party logistics companies were the only targeted companies, as their predominant business included storage facilities as part of their holdings. Even though trucking was also part of their businesses, warehousing was still classified as a major source of revenue. The categories of warehousing services that they provide include, but not limited to: consolidation, trans-shipment, cross-dock, sortation, fulfillment and third party logistics.

Warehouses and distribution centres that are linked to retailers (e.g. IKEA, Canadian Tire, Giant Tiger, and Loblaw etc.) were not added to the list of warehouses for this study. Even though they are categorized as distribution centres that are similar to those in this study, retrieving specific data about facility size and services etc., was not readily available and not information that is frequently given out. The publicly available environmental sustainability reports that the companies put out talk more about the energy savings and generally offer relatively little specific detail on their operations. A preliminary review showed that- the data being collected for this research was generally not part of their reports. Some of the large companies that do have their 'own' distribution facilities actually have them run by third-party warehousing companies. As an example, TJX Canada has a facility that is run by Schenker. That specific warehouse follows the sustainability program that was placed into the facility by Schenker itself.

3.2.2 Content Analysis of Company Websites

Content analysis is "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff 2004:18). Content analysis became the basis for data collection on environmental sustainability programs already in place in the warehousing companies. In order to obtain the required data, a detailed review was done on the company websites.

All warehousing and 3PL companies listed in *Leonard's Guide* were included in the website review. A cross reference was done with the East Economic Directory of Ontario, to ensure that all possible warehousing, distribution and third-party logistics centres were captured (Ontario East Economic Development Commission 2014). There was an additional 16 companies added from the East Economic Directory that were not included in *Leonard's Guide*. There was no such directory to cross reference with in the Western area of Ontario.

All websites were reviewed to determine what information was available on the environmental sustainability initiatives the company had put in place for its warehousing operations. The websites would normally have a sitemap which allowed the search to proceed to the company history or company overview. This was normally the area that would contain any reference to sustainability programs that the warehousing company subscribed to. Some companies had

direct links to their environmental sustainability or corporate responsibility on their websites. The review of each website was guided by a pre-developed spreadsheet to organize the data collection and coding.

The criteria for collecting data from the publically accessible sites are outlined in Table 3.1. The criteria were developed with reference to the research objectives outlined earlier. The table also outlines the objectives that would be answered through the collection of the data.

The data collection began in accordance to the criteria chosen in table 3.1 from Leonard's Guide. Once the information from the guide was inputted in the spreadsheet the additional information that was needed was collected from the company websites. If all the information required to match the criteria was not found, then additional websites were sourced. This included: Statistics Canada Industry directory and Mantra. If data was collected outside of Leonard's Guide and the company websites, then additional websites used and were referenced at the end of the thesis in Appendix D. The data was divided into two categories: 3PL, and warehousing and distribution facilities. The division of data was done in accordance with Leonard's Guide. They separate 3PL from regular warehousing and distribution facilities as they are considered providers of different logistics services. Third-party logistics are a provider of outsourced logistics services and integrate the elements of warehouse and transportation.

Table 3.1 Selection of Criteria for publicly accessed data

Criteria Examined	Rationale
Sustainability progam exists	Relates directly to OBJ-1
Type of Program	The determination of a sustainability program then leads to the classifying of whether the program is standardized or customized.
	Customized- defined as, "to change (something) in order to fit the needs or requirements of a person, business, etc" (Merriam-Webster Dictionary 2016). Such programs include general: re-use/recycling, energy effeciency, efficient water usage, emissions reduction etc. Recycling/reduction in waste, efficient energy use, efficient water usage, electric/battery powered forklifts or other independent environmental programs have been considered customized for the purpose of this study as it may be a localized program for one specific area, or can be top-driven and a business strategy implemented throughout business.
	Industry recognized program such as Smartway/Fleetsmart, the Green Vehicle Program, LEED and ISO 14001 are customized environmental sustainability programs that require by-in at all levels of an organization. They also require a formal monitoring program to be in place in order to maintain accreditation. This generally indicates that more than one department has made a conscious effort to contribute to the effort and the decision is generally a top down decision requiring executive support. This is also an indication how entrenched a program could be within the organization and reflects the level of commitment by top management.
	These were the criteria to relate back to research objective OBJ-1 and OBJ-2.
Trade area	To determine if size of the trade area will influence the likelihood of a company implementing an environmental sustainability program. The market reach was categorized as:
	Local- company only has one warehouseing facility with a centralized head office at facility.
	Regional-company has more than one warehousing facility, all within the same province. Head office is either maintained at one facility or is a stand alone.
	National-company has more than one warehousing facility and are located in other provinces outside of Ontario. The head office is maintained in Ontario.
	Canada-USA- company has more than one warehousing facility that are located both nationally and in the USA. The head office is located in Ontario and may or may not have affiliate offices in the USA.

Table 3.1 Selection of Criteria for publicly accessed data continued…

Criteria Examined	Rationale
Trade area contd.	International-company has more than one warehousing facility and are located in multiple countries around the world and have a head office or divisional office in Ontario.
	This criterion is used as a determining factor when cross-associating with the likelihood of having an environmental sustarinability program and relates back to OBJ-4.
Physical size of warehousing	Used to determine if size of facilities impacts the likelihood that an environmental sustainability program is implemented. This criterion relates back to OBJ-5.
Company ownership	Used to find out what the predominant ownership in the industry is and a determinant in likelihood of an environmental sustainability program being implemented. This will be used as a possible cross-association with other criteria.
	Private- A closed company controlled and operated by private individuals (BusinessDictionary.com 2016).
	Public- A company that has more than 50 shareholders and whose shares are offered for public subscription (Dictionary.com 2016).
Number of Employees	This will be used as a possible cross-association with other criteria. The categories for company size are based on Statistics Canada data (Statistics Canada 2015).
	Small- 1-99 employees
	Medium- 100-499 employees
	Large- over 500 employees
Classification of Business	Used to determine if classification of business made an impact on whether a sustainability program would exist and/or be more entrenched within the organization. An analysis would also be done as to which programs, if any, were more likely to be in place.
	Third-party logistics (3PL)- is a provider of outsourced logistics services. It integrates the elements of warehouse and transportation. Logistic services encompass anything that involves management of the way resources are moved to the areas where they are required (TechTarget 2016) .
	Distribution centre- facility that is usually smaller than a firm's main warehouse and is used for receipt, temporary storage, and redistribution of goods according to the customer orders as they are received. Also called branch warehouse or distribution warehouse (BusinessDictionary.com 2016).

Table 3.1 Selection of Criteria for publicly accessed data continued…

Criteria Examined	Rationale
Classification of business	Warehousing Centre- Performance of administrative and physical functions associated with storage of goods and materials. These functions include receipt, identification, inspection, verification, putting away, retrieval for issue, etc. (BusinessDictionary.com 2016).

3.2.3 Survey (Questionnaire) of Warehousing Companies

The publicly available information in *Leonard's Guide* and company websites was supplemented with data gathered through a questionnaire. Questionnaires have been extensively used in other studies (McKinnon 2010; McKinnon et al. 2015; Macias 2013; Murphy and Poist 2003). The questionnaire used two open-ended questions that allowed for unbiased answers in regards to types of environmental programs that a company subscribed to. The closed-ended questions were either used for qualifying or classifying. A questionnaire allowed tailoring of questions to the industry, allowed for data collection that held significance to the research study, kept the anonymity of the respondants and kept questioning consistent regardless of the size or type of warehousing company. The drawbacks to the survey method includes: the possibility that questions may not be understood by those taking the survey and the possibility of a low response rate. The summary of questions and relevance to the study are outlined in Table 3.2.

A pilot questionnaire was done to ensure comprehension of what was being asked and that the information collected would support the objectives of the research. "We want to be certain that our questions measure the concepts or behaviours we want them to measure, that the data produced represent 'true' values for these measures and do not contain too much random variability" (Collins 2003:229). The pilot questionnaire was pre-tested by a warehousing executive. He was overseeing a warehouse that was installing a new environmental sustainability program. The warehouse is owned by a large third party logistics firm that is part of the study. He aided with the questionnaire design and the material included. There may be some consideration to bias, as only one respondent was used for the pre-test, but this did not seem to be evident with the ensuing responses from the official send.

Once the questionnaire was finalized, it was sent to representatives at all warehouses on the list. A time period of three weeks response time was given for the initial send. A second email invitiation was then issued to non-respondents, with a final follow-up phone call.

The questionnaire was sent by FluidSurvey to warehousing and distribution centres as well as third-party logistics businesses. The email addresses were taken prodominently from 'Leonard's Guide' and from the companies direct websites. The questionnaire was sent to those who held titles of general manager or higher. The predominant amount of warehouses in the study were privately owned companies. They were normally run by family members with a small employee

base. As such, the emails were addressed to the president of the company. The larger national and international companies usually had general managers at their individual centres, or had an dedicated sustainability manager. In these cases, the general manger or sustainability manager was sent the questionnaire.

Table 3.2 Survey Questions

Survey Question	Rationale
Q1. Does your company have an environmental program in place?	This question relates to the purpose of the study. This was also a qualifying question.
Q2. Does your company have an industry recognized environmental sustainability program?	Used to determine if a more entrenched environmental sustainability strategy was employed. Industry recognized programs generally indicate that more than one department has made a conscious effort to contribute to the program and the decision is generally a top decision requiring executive support and approval. Used as criteria to relate back to research objectives OBJ-1 and OBJ-2.
Q3. What is/are the name/s of the environmental sustainability program/s your company subscribes to?	This allowed the listing of the programs that the company subscribed to without inflencing any specific programs or names. This criteria would relate back to reseach objectives OBJ-2 and OBJ-3.
Q4. What in-house program have you implemented?	This question was for those companies that implemented independent programs that weren't considered 'formal' and requiring accreditation. This relates back to OBJ-3.
Q5. Who champions your environmental sustainability program?	This question relates back to OBJ-2, as it would give an indication how entrenched the program would be in a company. If there is a committee or department, than more effort and resources would have been allocated to the program. In small companies a dedicated person would also be indicative of a formal program. More information from the data would be needed to make this type of supposition. This question relates back to OBJ-2.
Q6. Please name the departments in your company that are involved in the environmental sustainability program?	This question relates back to OBJ-2 and allows for data that would explain how involved or environmentally conscious the company has been. This question would be cross-associated with OBJ-4 and OBJ-5.

Table 3.2 Survey Questions continued

Survey Question	Rationale
Q7. How long has your company had the program/s in place?	This question relates back to OBJ-2 and allows for data that would explain how involved or environmentally conscious the company has been. This question would be cross-associated with OBJ-4 and OBJ-5.
Q8. What are the reasons for implementing an environmental sustainability program?	This data was requested to give a better understaning of the overall need for implementing an environmental sustainabilty program. It would also be an indicator for OBJ-2.
Q9. Are there any external organizations involved in your environmental program?	This data was requested to give a better understanding if outside forces were responsible in presurring a company into pursuing an environmental sustainability program. If the answered 'yes', they would move onto next question.
Q10. Which external organizations are involved in your environmental program?	Many companies implement on the basis of pressure from government, other companies within their supply chain (customers) or other external forces. This data will allow for cross association with OBJ-2 and OBJ-3.
Q11. How would you rate the effectiveness of your environmental sustainability program?	This data was requested as a cross association with OBJ-2.
Q12. What is the reason for not implementing an environmental sustainability program into your organization?	This question is to understand the areas of opportunity in the future for the industry. This data would be used in the conclusion and to determine further opportunities of study.
Q13. Will your organization be implementing an environmental sustainability program in the future?	For companies that did not yet have a program in place, the request for his data would indicate if changes in attitude were occurring towards establishing an environmental sustainabilty program. This data would also be cross associated with OBJ-4, OBJ-5 and OBJ-6.

Table 3.2 Survey Questions continued

Survey Question	Rationale
Q14. What is the timeline of implementation?	As a continuation of previous question, this data would be used to indicate the urgency the companies feel, within their industry and supply chain to conform to environmentally sustainable programs. This data would also determine further research opportunities and industry opportunities.
Q15. Job title of person completing questionnaire.	This question would allow for cross association with OBJ-2 and OBJ-4 to understand if responsibility for environmental sustainability programs falls at different levels in an organization based on those objectives.
Q16. What is your company classification?	This question relates directly to OBJ-4.
	Local- company only has one warehouseing facility with centralized head office at facility.
	Regional-company has more than one warehousing facility, all within the same province. Head office is either maintained at one facility or is a stand alone.
	National-company has more than one warehousing facility and are located in other provinces outside of Ontario. The head office is maintained in Ontario.
	Canada-USA- company has more than one warehousing facility that are located both nationally and in the USA. The head office office is located in Ontario and may or may not have affiliate office in the USA.
	International-company has more than one warehousing facility that are located in multiple countries around the world and have a head office or divisional office in Ontario.

Table 3.2 Survey Questions continued

Survey Question	Rationale
Q17. Warehouse facility is classified as:	This directly refers to OBJ-1 and OBJ-2. Private- A closed company that is controlled and operated by private individuals (BusinessDictionary.com 2016). Public- A company that has more than 50 shareholders and whose shares are offered for public subscription (Dictionary.com 2016). Leased-did not apply to any of the warehouses that were part of the content analysis.
Q18. What service offerings does your facility provide?	Refers directly to OBJ-1, OBJ-2 and OBJ-6.
Q19. Size of warehouse by square footage.	Refers directly to OBJ-5.

3.3 Data Analysis

Once the data was collected, it was sorted under each of the categories as shown in Table 3.1. Each category contained sub-categories, in order to allow a more detailed/refined view of the information being tabulated. The tabulation was done on a spreadsheet and listed based on frequency of occurrence. Frequency in this situation is defined as, "the rate of occurrence of anything; the relationship between incidence and time period" (Wikitionary 2016). As stated by Glaser and Strauss (1967), data analysis relies on coding. The information is broken down and labelled allowing comparison of one group of data to another. Codes can be combined and related to one another in the form of concepts (Glaser and Strauss 1967; Engward 2013). This was also determined as the best means of tabulating data due to the small sample size used for this study.

The results of the tabulations were then put into graphs. The results of questions that requested answers based on two possible choices; company's ownership (private or public), whether a company had an environmental sustainability program in place (yes or no), were depicted using a simple pie chart. The results were expressed both as unit count and as a percentage. The reason that the results were not solely expressed as a percentage was that the total company sample size was too small for statistical significance.

The results from questions that could be answered with more than 2 variables were graphed using bar graphs. This was considered the best means of expressing categorical data since, "bar graphs represent each category as a bar. The bar heights show the category counts or percent" (Starnes et al. 2012). The data results were, once again, expressed as category count and as a percentage within the body of the explanation to bring attention to any notable occurrences.

Once all the categorical data was tabulated and graphed, there were certain occurrences that stood out. To understand if there were any specific trends that could be seen, a table was created to cross tabulate the data.

Chapter 4: Results and Discussion

This chapter presents a summary and discussion of the results. The chapter will begin with a summary and discussion the results obtained from the content analysis of company websites. A review of the results from the questionnaire will follow. This will include a discussion of the challenges that were afforded from using the questionnaire method. The final section will compare the findings to similar studies done in the United States and Europe.

4.1 Results from Content Analysis

The results will be analyzed on the basis of the two different categories of business. As stated previously, the data was divided into two categories: 3PL, and warehousing and distribution facilities. The division of data was done in accordance to Leonard's Guide. They separate 3PL from regular warehousing and distribution facilities as they are considered providers of different logistics services. Third-party logistics are a provider of outsourced logistics services and integrate the elements of warehouse and transportation. As a result, the third-party logistics sector will be analyzed first, on the basis of the criteria chosen, and then the warehousing and distribution sector will be analyzed on the same criteria. The separation of the 2 groups brought out noteworthy differences that will be discussed throughout the analysis.

4.1.1 Prevalence of an Environmental Sustainability Program

Objectives 1 and 6 look at determining the percentage of Ontario 3PLs and warehousing and distribution companies having implemented an environmental sustainability program, as well as if the company classification (3PL or warehousing and distribution centre) made an impact.
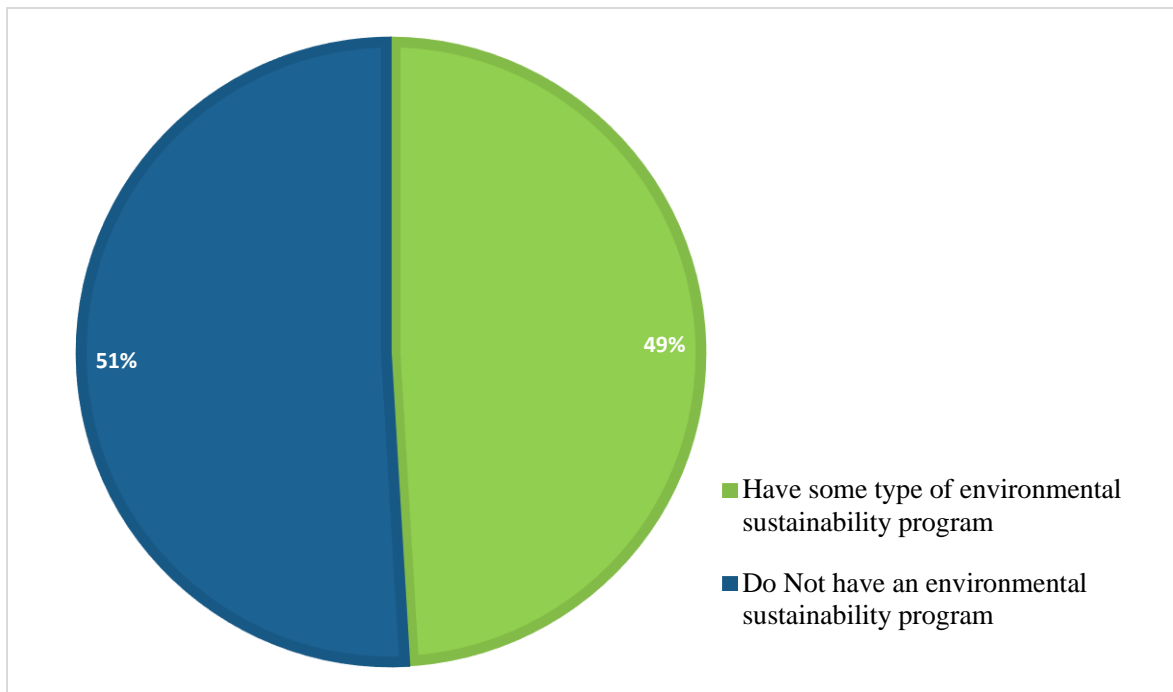
Figure 4.1 Third-Party Logistics with Environmental Sustainabilty Programs

When analyzing the results of third party logistics companies that had some type of environemtal sustainability program (figure 4.1), whether customized or industry recognized; 26 of 53 (49%) companies had some type of program in place, leaving 27 of 53 (51%) that did not have any information on this on their websites.
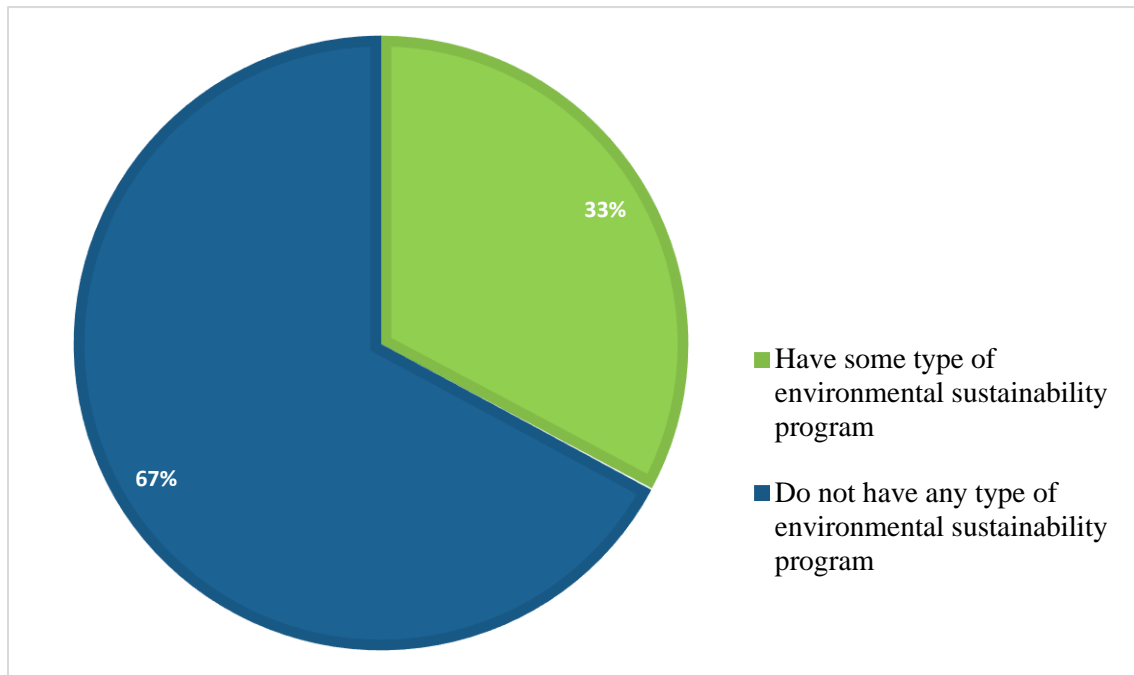
Figure 4.2 Warehousing and Distribution Centres with Environmental Sustainability Programs

Figure 4.2 refers to the analysis of warehousing and logistics companies that had some type of environmental sustainability program. The breakdown was: 22 of 67 (33%) did have a program in place and 45 of 67 (67%) did not. This was an interesting initial finding that third-party logistics, in the early stages of this study, are more likely to have an environmental sustainability program in place. This also holds true to the findings in the academic literature that was supported by Lieb and Lieb (2010).

As stated previously when discussing the study done by Lieb and Lieb in 2008 and 2009, the paper documented the, "extent to which large third-party logistics (3PL) companies have committed themselves to environmental sustainability goals" (Lieb an Lieb 2010:524). When the CEOs of these companies were asked for the reasons why they implemented environmental sustainability programs, the top responses were directly attributed to, "brand maintenance issues…as these dimensions of a brand become more important in situations where brands offer more or less the same services and seek a legitimate basis for differentiation" (Lieb and Lieb 2008:46). In a 2006 survey done by Leib and Leib, CEOs were asked the same question in regards to what they do to differentiate themselves from their competitiors; establishing an

environmental sustainability program was not even mentioned. It is to be noted that the CEOs included in the study were from companies from North America, Europe and the Asia-Pacific region. This would indicate that environmental sustainability was not considered an important element to these companies even a decade ago, in any area of the world.

Specifically looking at warehousing with the exclusion of third-party logistics (3PL), it has been said that these companies, "have little regard for the environmental impacts of their actions and do not understand the social consequences of their business activities. These companies consider factors such as cost effectiveness and customer satisfaction as the main performance indicators" (Tan et al., 2010:874; Linton et al., 2007).   This will hold true as the the data analysis progresses.

4.1.2 Prevelance of an Industry Recognized Environmental Sustainability Program

Objective 2 questions how deeply entrenched the sustainability programs are within the 3PL and warehousing companies.
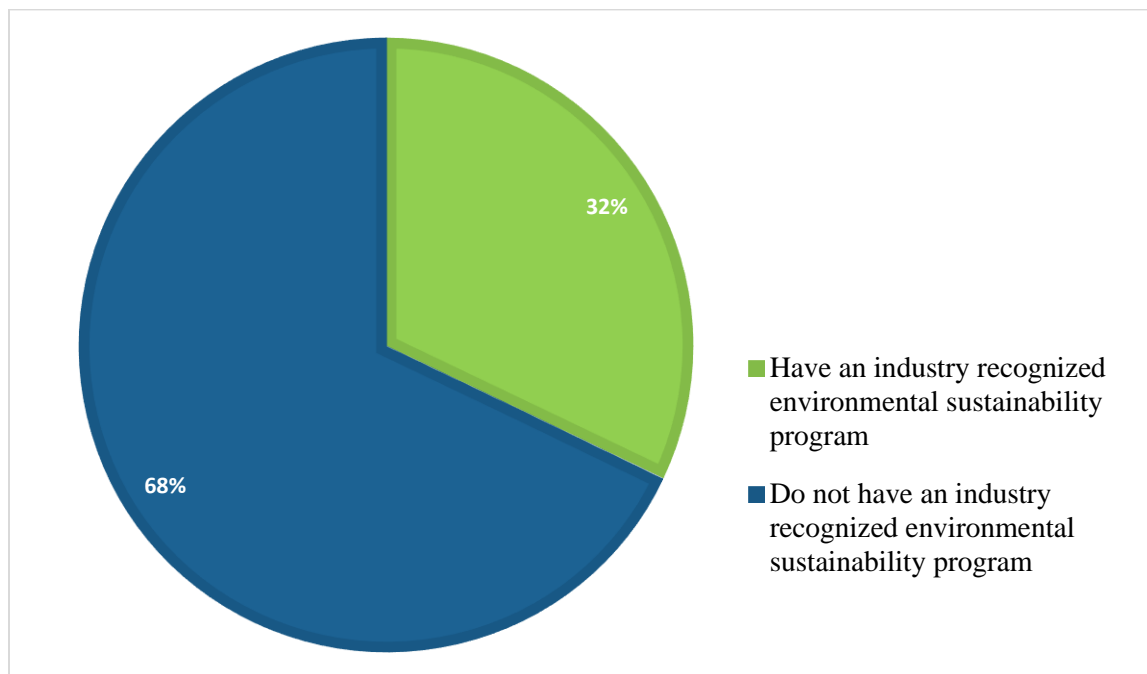
Figure 4.3 Third-Party Logistics with an Industry Recognized Environmental Sustainability Program

When the criteria of industry recognized environmental sustainability program was put into question (figure 4.3), the results indicated that 17 of 53 (31%) companies subscribed to some type of industry recognized environmental sustainability program. When we compare this to the data from Figure 4.1, the predominant amount of environmental sustainability programs that were present in third party logistics were classified as industry recognized.

Thirty-six of 53 (69%) companies did not have any type of industry recognized environmental sustainability program in place.
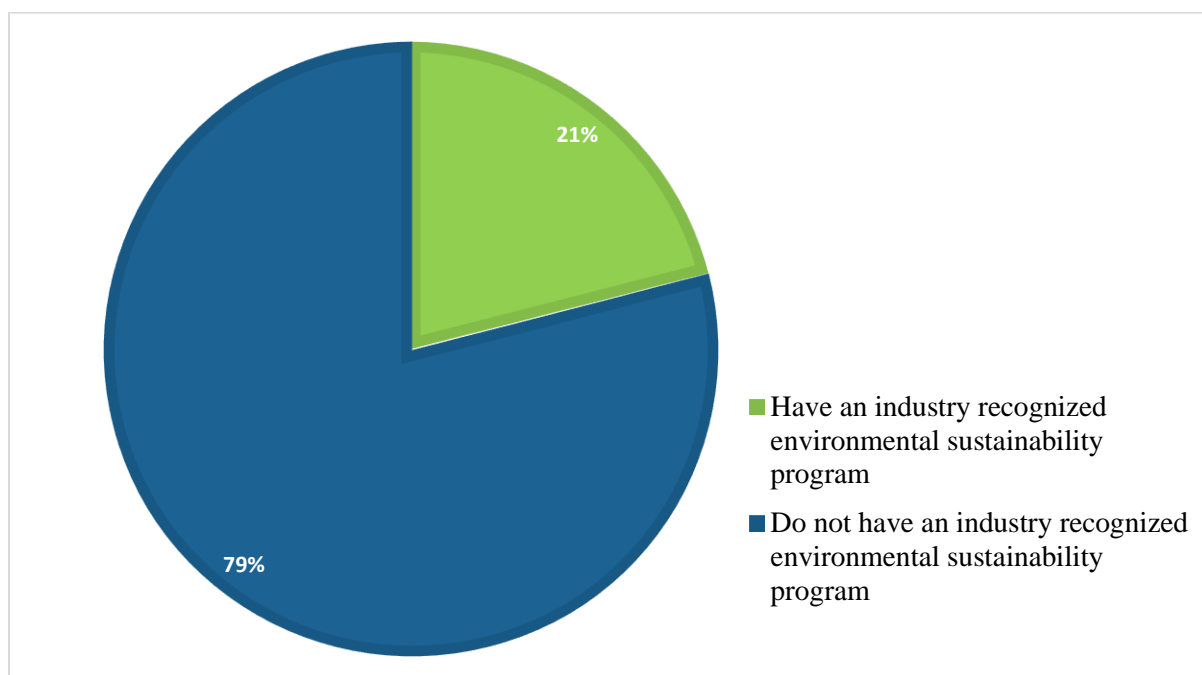
Figure 4.4 Warehousing and Distribution Centres with Industry Recognized Environmental Sustainability Programs

When the analysis was presented on the basis of warehouses and distribution centres that had an industry recognized environmental sustainability program, 14 of 67 (21%) had such program, and 53 of 67 (79%) did not. When the data is compared to Figure 4.2, the data indicates that a high prevalence of warehousing and distribution companies, with an environmental sustainability program, had an industry recognized environmental program in place.

In order for an environmental program to succeed and be effectual, it was determined that, "the key to achieving desired collaborative breakthroughs is to establish strong managerial commitment to supply chain management" ((Fawcett et al. 2006:23;Akkermans et al. 1999; Lummus et al. 1998). The commitment needed to come from all levels of manangement in the organization with the endorsement coming from the CEO (Marien 2000; Stalk et al. 1992). This is an improtant element of any business strategy, as top management has the capability of allocating resources and implementing the program within the corporate culture. For most companies, this is the most difficult element to overcome (Fawcett et al. 2006). The level of entrenchment is generally based on the scope of the environmental sustainability program that is put into place. Programs such as: SmartWay, Fleet Smart, LEED, ISO 14001 etc, require a large amount of human resources, time and financial commitment in order to succeed and be effectual. They are also customized to the company, as there are certain requirements that need to be met for a company to be accredited in these programs. Once the programs are successfully implemented, there are audits that need to be conducted to ensure that the program is functioning properly and that compliance to the standards is continually being met. This audit is also required to ensure that accreditation can be maintained.

With this in mind, the research looked at the percentage of companies that did have an industry recognized environmental sustainability program in place as an indicator of entrenchment within their companies.

With reference back to objectives 1 and 2, in this sample it is clear that 3PL companies are more likely to have an environmental sustainability program, in comparison to general warehousing companies, and they are also more likely to have an industry recognized program. In the industry as a whole, the percentage of companies with an environmental sustainability program averages to approximately thirty percent. This gives us an indication that there is much work that can still be done in this industry to encourage sustainability.

4.2.2 Most Popular Environmental Sustainability Programs based on Business Classification

With reference to objective 3, there were initiatives that were shown to be more prevalent in a warehousing and distribution facility vs a 3PL facility.
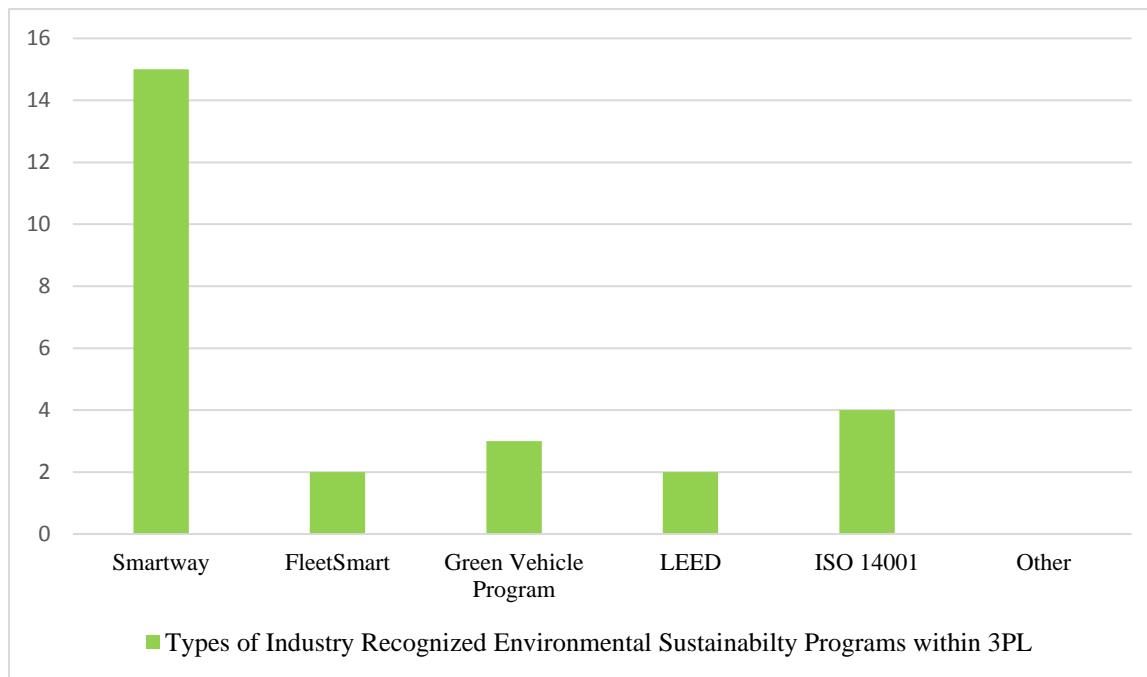
Figure 4.5 Types of Industry Recognized Sustainability Programs within 3PL Companies

When analysis turned to the type of industry recognized sustainability programs that were present in 3PL companies, the 15 companies of 17 (88%) had SmartWay. It was followed by the 4 had ISO 14001 (24%), 3 having the Green Vehicle Program (18%), 2 had FleetSmart (12%) and 2 had LEED (12%). Third-party logistics implementing SmartWay as the most common program was not a surprising result, as third-party logistics have trucking fleets as part of their operations. There were also overlaps in programs subscribed to by these companies, giving an indication that environmental sustainability as a business strategy was more likely, and program entrenchment within the company would be deeper.
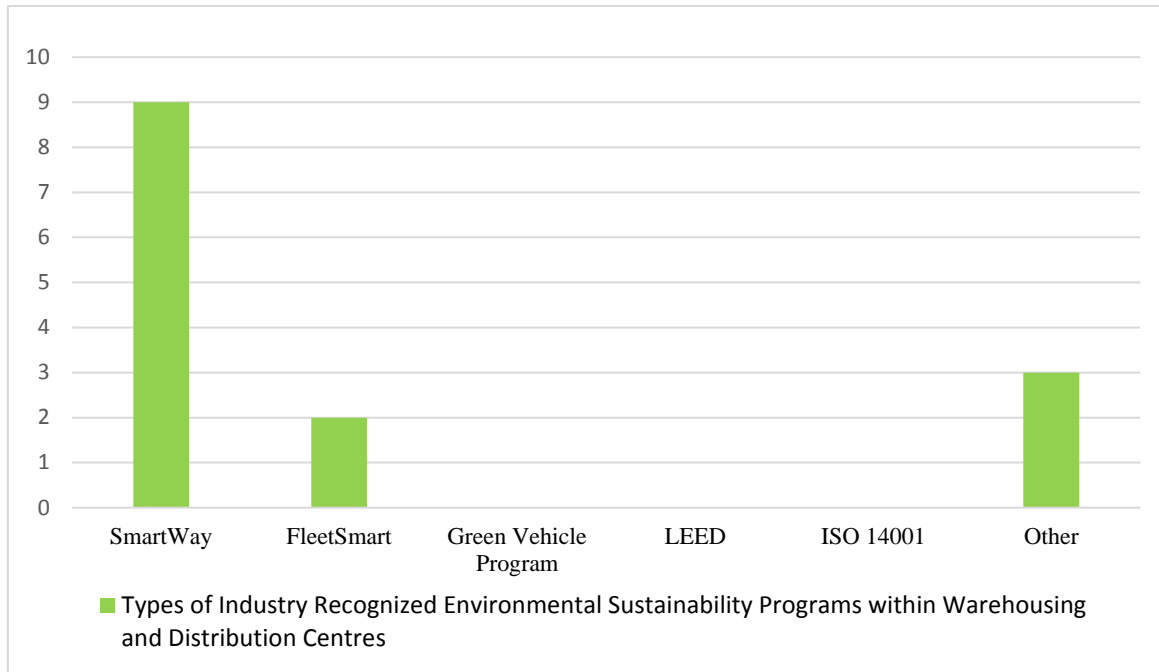
Figure 4.6 Types of Industry Recognized Environmental Sustainability Programs within Warehousing and Distribution Centres

In figure 4.6, the data shows that SmartWay is the predominant environmental program chosen by the companies. Of the 14 warehousing and distribution companies that stated they had an industry recognized environmental program, 9 (64%) had SmartWay and 2 (14%) had FleetSmart and the other 3 (21%) had industry recognized programs that were not the ones specifically categorized.

Warehousing and distribution companies' main objectives have been, 'the efficient and economic use of energy inputs, typically fossil based, that provide power for equipment (forklifts, conveyors etc.); and regulation of temperature (heating and cooling), light (internal and external) and water for personal hygiene and process (Baker and Marchant 2010).   For 3PL companies, the most impactful route for emission reduction has been through its fleet maintenance. As transport makes up a significant portion of their business, it would only be logical to implement an environmental sustainability program within this portion of the business. In the 2008 survey done by Lieb and Lieb, it was discovered that the initiatives that the surveyed companies put into place were transport oriented. They included but were not limited to: purchasing more fuel-efficient vehicles, reducing vehicle mileage operated, participating in the

SmartWay program, shifting freight to more fuel efficient modes, qualifying fleet operators based on their equipment and performance and reducing idling time (Lieb and Lieb, 2010). With this in mind, the analysis will now look at how closely the results mirror the literature.

The results for the 3PL companies reflected the findings in the study by Lieb and Lieb (2010) quite accurately. The predominant industry recognized program that was implemented was SmartWay or program that was similar in nature. It was also the chosen program for warehousing and distribution companies. This was surprising, as the assumption would be that warehousing and distribution companies would try to make their warehousing the focal for their industry recognized environmental sustainability program. These companies would also have a portion of their business devoted to transport, so it would be important for them to ensure that their fleet of vehicles was as environmentally efficient as their competitors'.
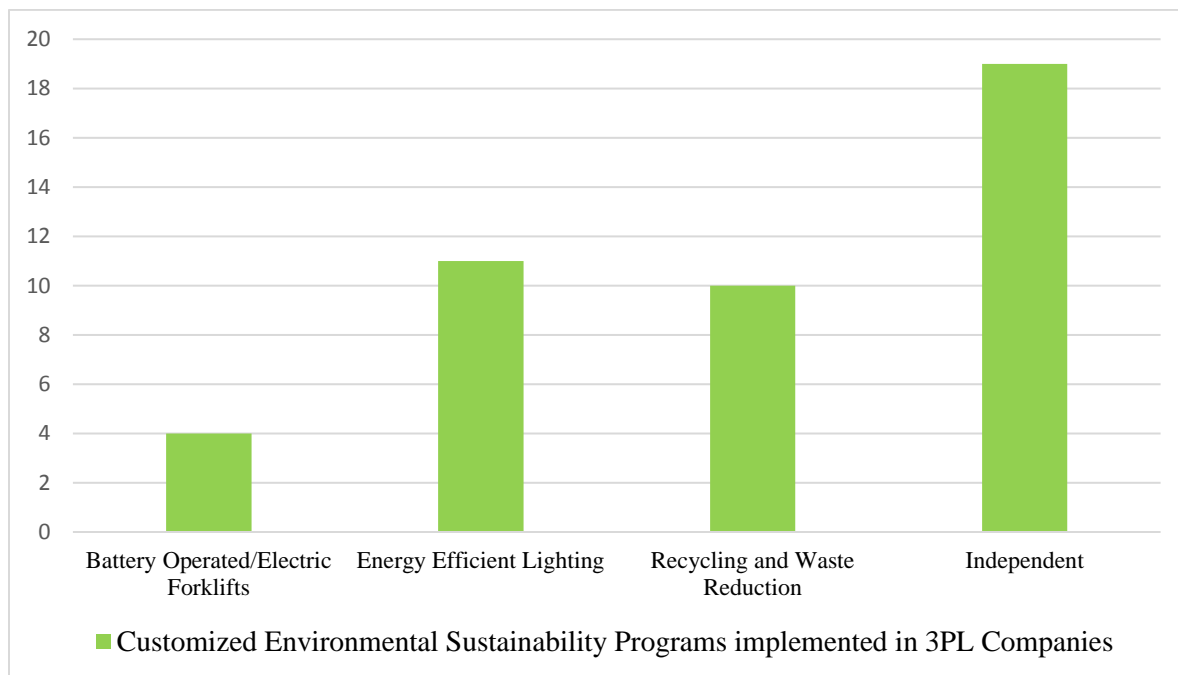
Figure 4.7 Customized Environmental Programs implemented in 3PL Companies

Figure 4.7 shows that of the programs that are in place within 3PL companies, there are a great deal more independent programs 19 of 26 (73%). Some examples of these programs include:

tree planting, supporting exterior environmental programs through monetary donations, having staff participate in carpooling or encouraged biking to work, teaching staff to be more environmentally conscious in their private homes, installing green space around facilities etc. In the 2008 study done by Insight, "it was seen that many small initiatives where benefits arise quickly are a popular way to begin the journey" (Insight 2008). These programs tend to emphasize what the company is doing in the community, rather than what it is doing with respect to its own operations. With respect to warehousing programs, having battery operated/electric forklifts was mentioned 4 of 26 (15%) times, an energy efficiency program came in at 11 of 26 (42%) and recycling/waste management came in at 10 of 26 (38%). Most of the companies had multiple programs in place.
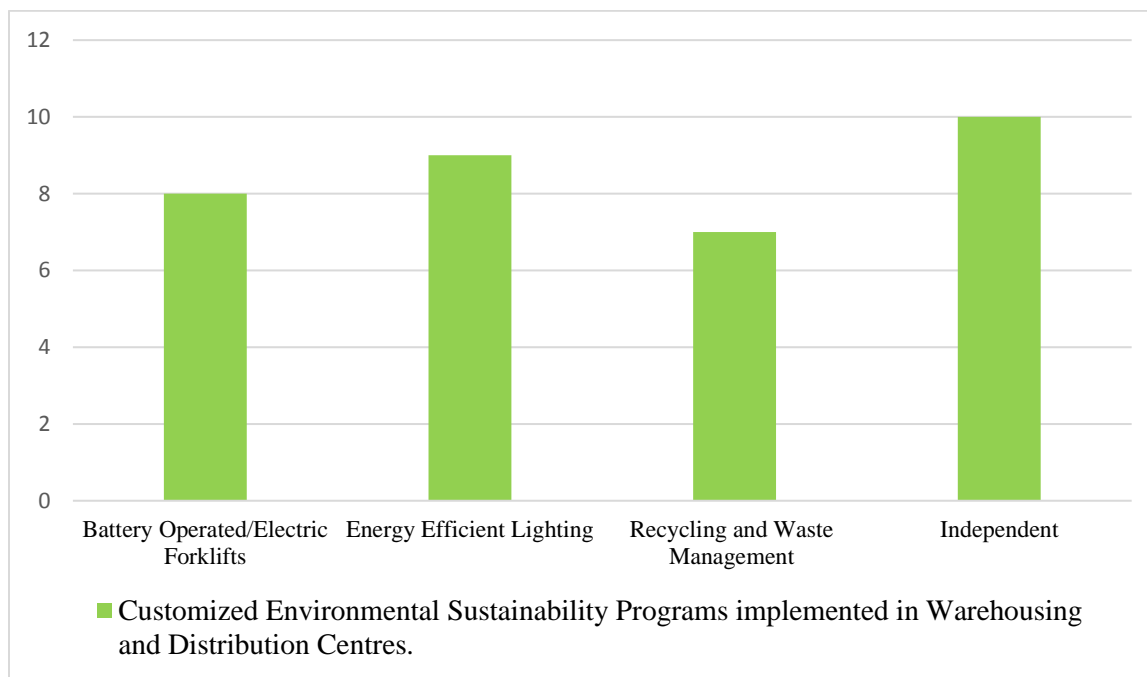
Figure 4.8 Customized Environmental Sustainability Programs Installed in Warehousing and Distribution Centres

Figure 4.8 depicts the types of customized environmental sustainability programs subscribed to in the warehousing and distribution sector. The most common program was installing energy efficient lighting, and the second most popular was having some type of independent program (e.g. installing solar panels on the roof, tree planting, making a charitable contribution to an

environmental program, encouraging employees to join in environmental programs, installing green space etc.). Ten of 22 (45%) warehouse and distribution centres had an independent program, and 9 of 22 (41%) had a lighting efficiency program. Usage of battery operated/electrical forklifts was 8 of 22 (36%) and having some type of recycling/waste management program was 7 of 22 (32%).

When the comparison is done between the 2 categories of business, the third-party logistics are far more likely to subscribe to an independent program that they feel is either easier to implement or done in a particular area or department. In the cases of companies making a charitable donation towards a program that supports an environmental sustainability program, than the decision is normally done at the executive level.

Warehousing and distribution companies indicated in their websites, to having customized programs that directly impact the efficiency of the facility itself through the installation of energy efficiency programs, using battery operated/electric forklifts to limit the amount of emissions being created and having some type of recycling/waste management program to deal with cardboard, packaging or other products used in stuffing/de-stuffing containers or storage boxes. This would be expected since warehousing and distribution centres' primary business is not only storage of product and ensuring that product gets re-distributed properly, but added-value services as well.

4.2.3 Impact of Trade Area on Environmental Sustainability Programs

Objective 4 looked to establish if the trade area of a 3PL or warehousing and distribution company would have an impact on whether or not it had an environmental sustainability program in place.
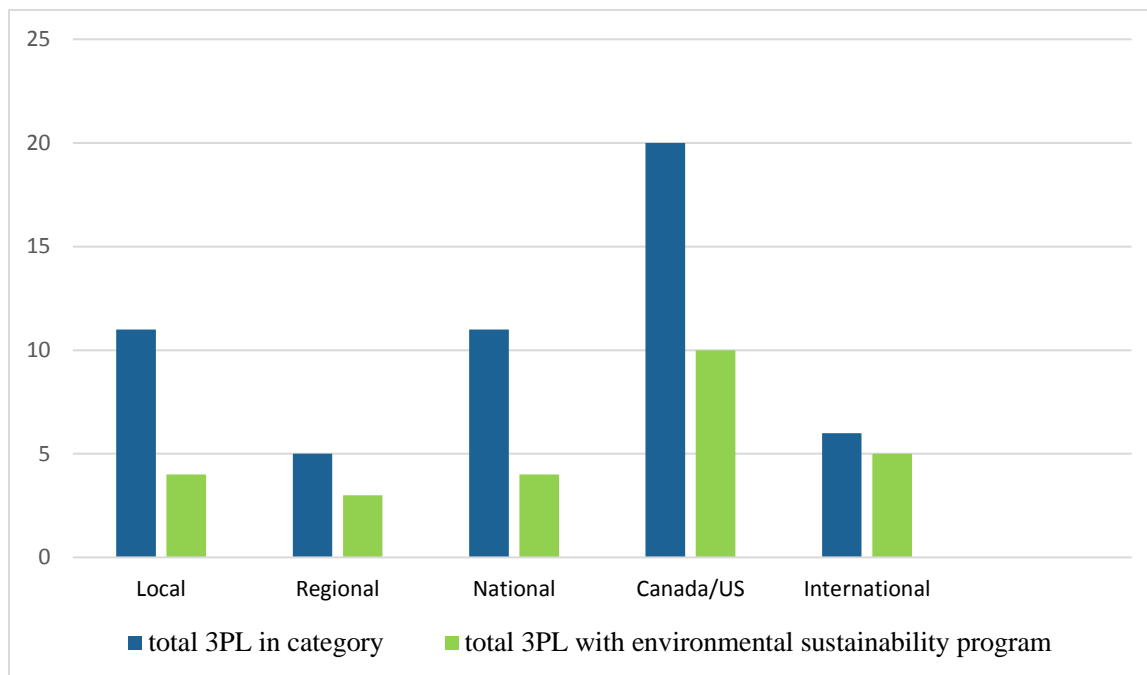
Figure 4.9 Third-Party Logistics' Trade Area vs Environmental Sustainability Programs

Figure 4.9 depicts the trade area of the third-party logistics data cross referenced with the total amount of third-party logistics companies with some type of environmental sustainability program. The data indicates 4 of 11 (36%) 3PL companies that are classified as local have an environmental sustainability program in place, 3 of 5 (60%) at the regional level had a program in place, 4 of 11 (36%) at the national level had a program in place, 10 of 20 (50%) at the Canada/US level had a program in place and 5 of 6 (83%) classified as international had a program in place.

Even though the sample size is small there are some observations that can be made based on the data. The data shows that, in this sample, as the trade area becomes larger, the likelihood of a

3PL to have an environmental program of some sort, increases. That said, the small number of companies involved makes it difficult to make casual claims. The sample size of companies classified as regional, would have to be increased before one could conclude that all companies at a regional level will have an environmental sustainability program. Having such a small sample size negates any ability to make such a claim.
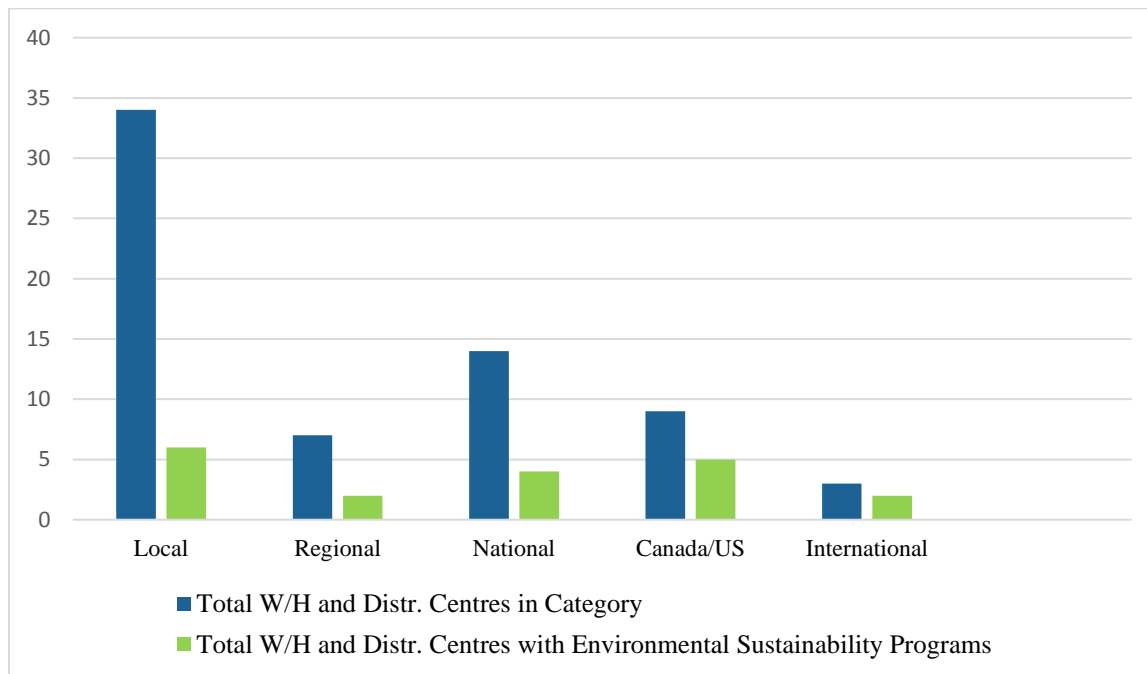
Figure 4.10 Warehousing and Distribution Centres' Trade Area vs Environmental Sustainability Programs

The analysis of the data in figure 4.10 shows that 6 of 34(18%) of local level warehousing and distribution centres have some type of environmental sustainability program in place, 2 of 7(29%) at a regional level facilities have a program, 4 of 14 (29%) at the national level have a program, 5 of 9(56%) at the Canada/US level have a program, and finally 2 of 3 (67%) at the international level have some type of program in place. The sample size is once again small, but when the percentages are taken into consideration, than a pattern does emerge. As trade area increases there is a pattern that a warehousing and distribution centre is more likely to have some type of environmental sustainability program in place.

When a comparison is done between 3PL and warehousing and distribution centres, the percentages are fairly similar and express the same pattern from the national level onward. In this sample, there is a greater percentage of companies undertaking an environmental sustainability program as the trade area increases and the company moves into other countries.

The following results of the analysis build on the literature findings.

It has been identified that companies implement environmental sustainability programs for numerous reasons; "regulatory compliance, competitive advantage, stakeholder pressures, ethical concerns, critical events and top management initiatives (Bansal and Roth 2000:717). The link that these companies have within the supply chain also had direct impact on the likelihood of having an environemental sustainability program in place. "It has been argued that the deeper and closer partnerships with a longer part of the supply chain are key elements of sustainable supply chain management"(Seuring and Gold 2013:2).

For some companies, the larger the trade area, the greater the impact outside forces would have such as government regulations of foreign countries or a greater amount of companies involved in the supply chain. In a 2008 study done by Insight, 30 large companies were asked to participate in interviews. The companies were from Europe (France and UK), North America and Japan. The findings in the study concluded that, "the bigger the company, the greater level of interest in the Green Supply Chain: 54% of companies with turnover in excess of 1 billion dollars claim to have established a Green Supply Chain, but this percentage drops to 29% for companies with turnover less than 100 million dollars. In recent years, there has also been a greater push put on world nations to decrease the emissions that are created within their borders. Germany, as an example, has been considered, "a global front-runner in environmental policy and practice…the German shift from fossil fuels and nuclear power towards renewable amounts to a veritable 'energy revolution'" (Achilles and Elzey 2013:1). Companies that either originate in Germany and have international divisions in other countries, or companies who wish to do business in Germany, would need to address these expectations within their business strategies. As an example, the German logistics companies; DB Schenker, Kuehne + Nagel and DHL are not only the largest logistics (by revenue) in the world, they also have very extensive environmental sustainability programs (Supply Chain 2013). Other programs affecting logistical trade area strategy would include, "the European Union's Energy Policy which calls for a 20%

reduction in green house emissions by 2020; -California's AB 32 Global Warming Solutions Act seeks to reduce emissions by 25% by 2020, and the UK Climate Change Act mandates an 80% reduction in emissions by 2050" (World Economic Forum 2009:6).

Another growing movement in environmental programs in developed countries is the development of voluntary programs as opposed to command-and-control approaches. "The United States Environmental Protection Agency and Department of Energy, and similar agencies in European nations, are now involved with several hundred diverse industrial voluntary programs, most of which relate to climate change and energy use. Examples of such programs include: SmartWay and The EPA 35/50 program for toxic chemical reduction (Krugman and Wells 2013:474) In Japan, thousands of voluntary programs have become integral features of governmental efforts to achieve energy efficiency and GHG reduction goals" (Baram 2008:78). In Japan, the government and businesses negotiated the Keidanren Voluntary Action Plan, which sets out the goals for GHG emission levels. "Because industrial policies are normally negotiated by the government with the Keidanren business association, participation in the Keidanren, and the agreement, is practically compulsory for large industry, although legally voluntary" (Morgenstern and Pizer 2007:326).

All these programs have goals to which companies need to adapt to, in order to do business in these parts of the world.

Trade Area +total number of companies in each category	Battery Operated/ Electric Forklifts	Lighting Efficiency Program	Recycling/Waste Management Program	Independent Program
Local N=5	4	2	0	2
Regional N=1	1	0	1	0
National N=4	2	4	4	4
Canada/US N=3	0	1	0	3
International N=4	2	2	3	1

Table 4.1 Most Common Environmental Sustainability Programs in Warehousing and Distribution based on Trade Area

In the data analysis of figure 4.8, it was found that warehousing and distribution centres had a higher incidence of having an environmental sustainability program tailored towards their facilities. Table 4.1 breaks this down even further. At the local level, having battery operated/electric forklifts is the most popular program. The sample of companies with a regional trade area was only one company, so no inference can be made for the type of preferred program. At the national level, having an efficient lighting program, a recycling/waste management program and some other independent program all tied in popularity. At the Canada/US level, independent programs are the most popular, and at the international level, recycling/waste management are the most subscribed to programs.

4.2.4 Analyzing the Impact of Facility Size on the Likelihood of having an Environmental Sustainability Program

Objective 5 sought to determine if the size of the facility would impact the likelihood of an environmental sustainability program being in place.
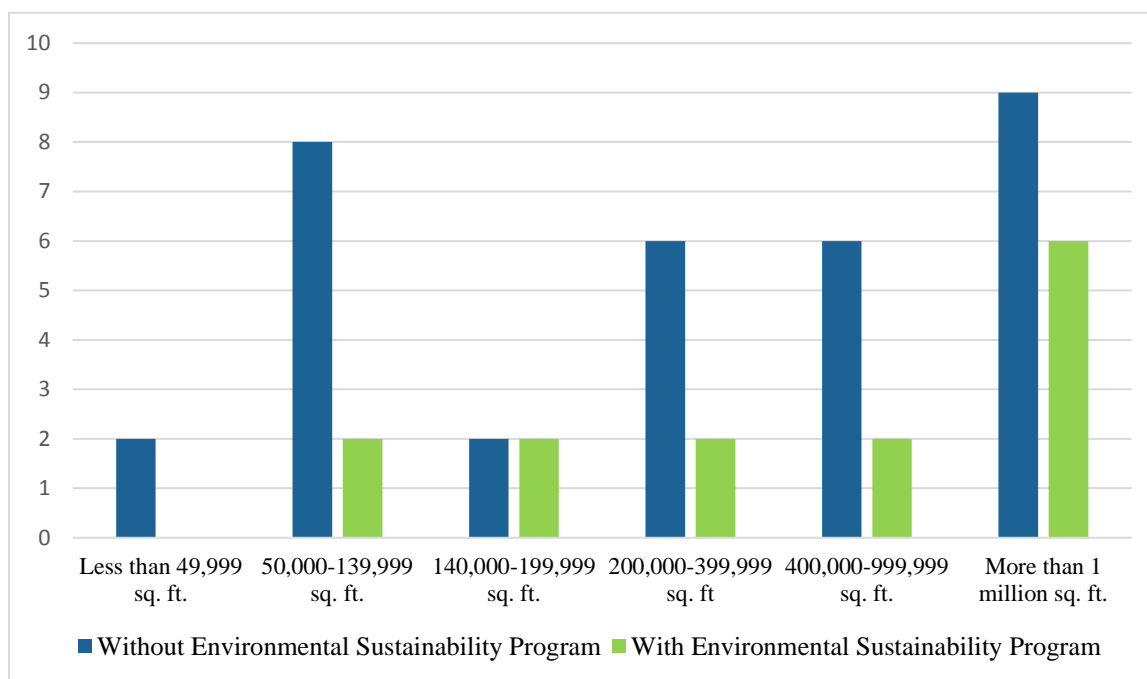
Figure 4.11 Comparing Facility Size and Likelihood of Facilities having an Environmental Sustainability Program in 3PL

Figure 4.11 compares facility size and the likelihood of the facilities having an environmental sustainability program. The results expressed as a percentage are as follows: N=32 (20 companies did not have any information on facility size on their company sites)

- < 49,999- 0 of 2 (0%)
- 50,000-139,999- 2 of 8 (25%)
- 140,000- 199,999- 2 of 2 (100%)
- 200,000-399,999- 2 of 6 (33%)
- 400,000-999,999- 2 of 6 (33%)
- 1 million – 6 of 9 (67%).

The likelihood of a third-party logistics company having an environmental sustainability program in place, based on size was a fairly uniform one in all categories less than one million square feet. There were at least two companies within each category that had some type of program in place. The noticeable occurrence was in the category of facilities that were less than 49,999 square feet, as they numbered zero. Those that exceeded one million square feet were also an exception. The percentage of probability went from an approximate thirty percent to that of sixty-seven percent. The total percentage of warehouses of this size make up 0.3% of the total warehouses in Canada (Government of Canada 2016). A larger sample size would have to be collected to validate this finding. This would hold true as well in the category of 140,000-199,999 square feet as well. The percentage was 100% but only included 2 companies. Due to the sample size one cannot infer much.

In the small sample of 3PL facilities over 1 million square feet, there was a greater percentage of companies having an environmental sustainability program, in comparison to the other categories. To gain a greater understanding as to why this may be occurring, this category was further broken down and cross compared with market reach. Figure 4.12 depicts those companies that not only have environmental sustainability programs, but also facilities over 1 million square feet. The results were:

- 1 of 6 (17%) had a national trade area
- 3 of 8 (50%) had a Canada/US trade area
- 2 of 8 (25%) had an international trade area

It was not surprising that companies that hold facilities of this size would have programs in place, as the environmental regulations in the US, Europe and Japan tend to be much more

stringent than in Canada or Ontario. This may change in the next few years with the
implementation of stricter emission controls through the new cap and trade program in Ontario.
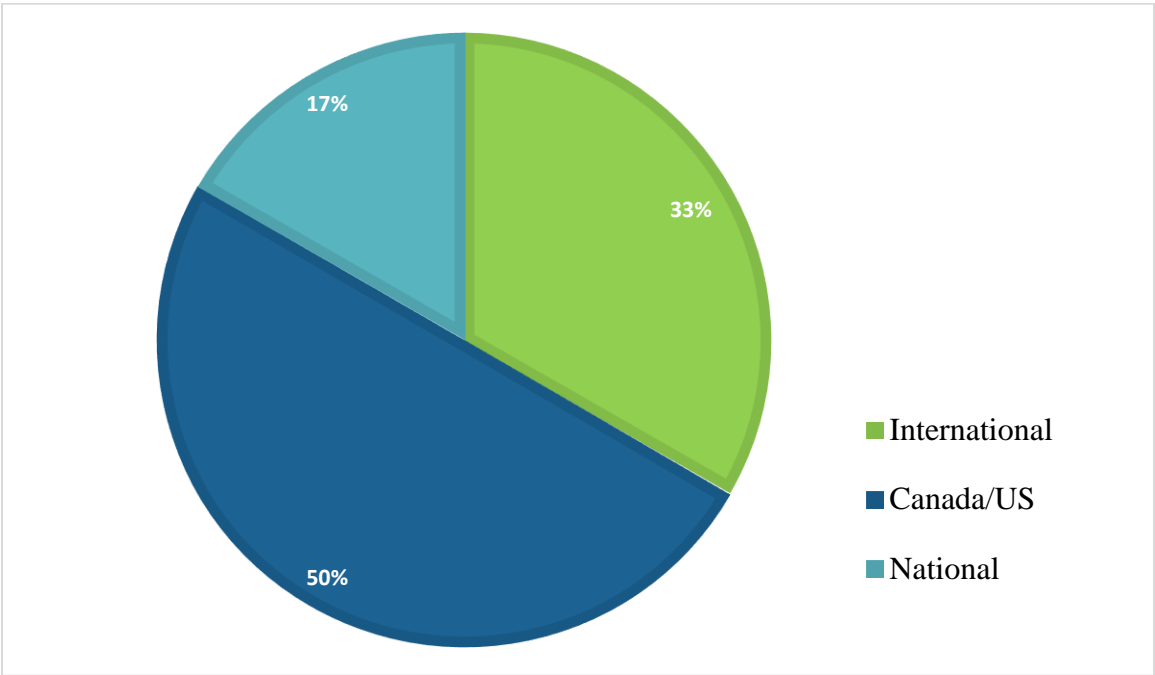
Figure 4.12 Market Reach of 3PL with Facilities Greater than One Million Square Feet and
having an Environmental Sustainability Program
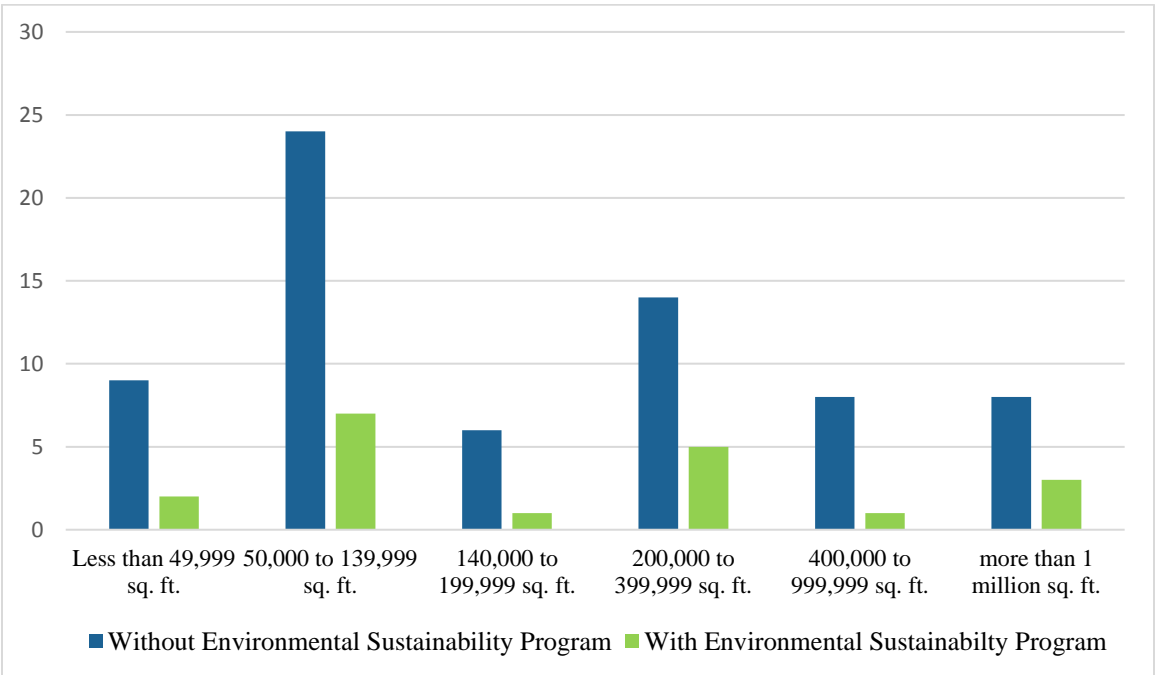
Figure 4.13 Comparing Facility Size and Likelihood Facilities have an Environmental
Sustainability Program in Warehousing and Distribution Centres.

Figure 4.13 compares the size of warehouse and distribution centres with the likelihood of having an environmental sustain inability program present. The breakdown was: N=67

- <49,999- 2 of 8 (25%)
- 50,000- 139,999- 6 of 21 (29%)
- 140,000 -199,999- 2 of 8 (25%)
- 200,000-399,999- 4 of 14 (29%)
- 400,000-999,999- 1 of 8 (13%)
- 1 million- 3 of 8 (38%)

The highest percentage of facilities that had an environmental sustainability program were those classified over 1 million sq. ft.

The one million square foot warehouses with environmental sustainability programs numbered three facilities. Of the three, 1 (33%) had a national reach, and 2 (67%) had an international reach. The sample size is too small to make any type of claim, but may give some indication to the direction that companies with an international reach might follow. More company results in this category would need to be included to see if any reliable pattern emerges. Overall, the sample sizes are too small to draw any meaningful conclusions.

As mentioned previously, "many SME companies have difficulty meeting the emerging environmental and social standards of their customers because of the limited financial funds, lack of human resource expertise, and difficulties identifying and acting on relevant information" (Lee and Klassen 2008:573). They have also tended to see themselves as playing, "minor or insignificant roles in their environmental impact. The real polluters are the multinationals" (Friedman and Miles 2002:324).

In a study done by Murphy et al. (1995), they found that, "larger firms attached greater importance to the management of environmental issues than did respondents from smaller firms….similarly respondents from larger firms inicated that there would be an increase in importance of environemental issues to their company in the next five years" (Murphy et al. 1995:15). The reasons for ensuring that SMEs in the supply chain implement environmental sustainability programs include, overall firm competitiveness, corporate culture, and the use of and availability of information (Hitchens et al. 2003; Lee and Klassen 2008). As a result, if the need arises SMEs will tend to align their requirements with their customer demands, which are normally larger companies with existing environmental sustainabilty programs. The large buyer

58

companies have come to understand this and have begun to use different appraoches to ensure the transferrance of information occurs. One approach has been monitoring-based, which is considered an arm's-length approach. "It controls the outputs in reference to a particular criteria and includes the gathering and processing of supplier information, setting of supplier assessment criteria, and the evaluation of the environmental performance of the product or service" (Lee and Klassen 2008:575). Another approach has been support-based which allows suppliers, "direct interaction of the buying firm with its suppliers to improve supplier environmental solutions through activities that include: providing training and education, sponsoring environmental summits for suppliers to encourage sharing of information and experience, and undertaking joint applied research to explore alternative materials or processes" (Lee and Klassen 2008:575).

From external resources, to alleviate the non-availability of information, "national and regional governments' green initiatives , such as those of the United Kingdom ((Lee and Klassen 2008: 575; Holt et al. 2001) and South Korea (Lee and Jang 2003), can help small firms develop more cost-effective environmental solutions. SMEs tend to have a tendency to hesistate to reach out for help if certain external stimuli do not exist" (Lee and Klassen 2008). This may be another of the reasons that SMEs in the Ontario warehousing industry would not see the value of implementation.

Additional data was gathered in the content analysis to mirror the information that was being gathered in the questionnaire. One of these categories included the size of company based on the number of employees it had. As a result, the information was tabulated based on the categories set out by Statistics Canada. This data set also contributes to the findings set out for application to objective five.

4.2.5 Comparison of Facilities based on Employee Numbers
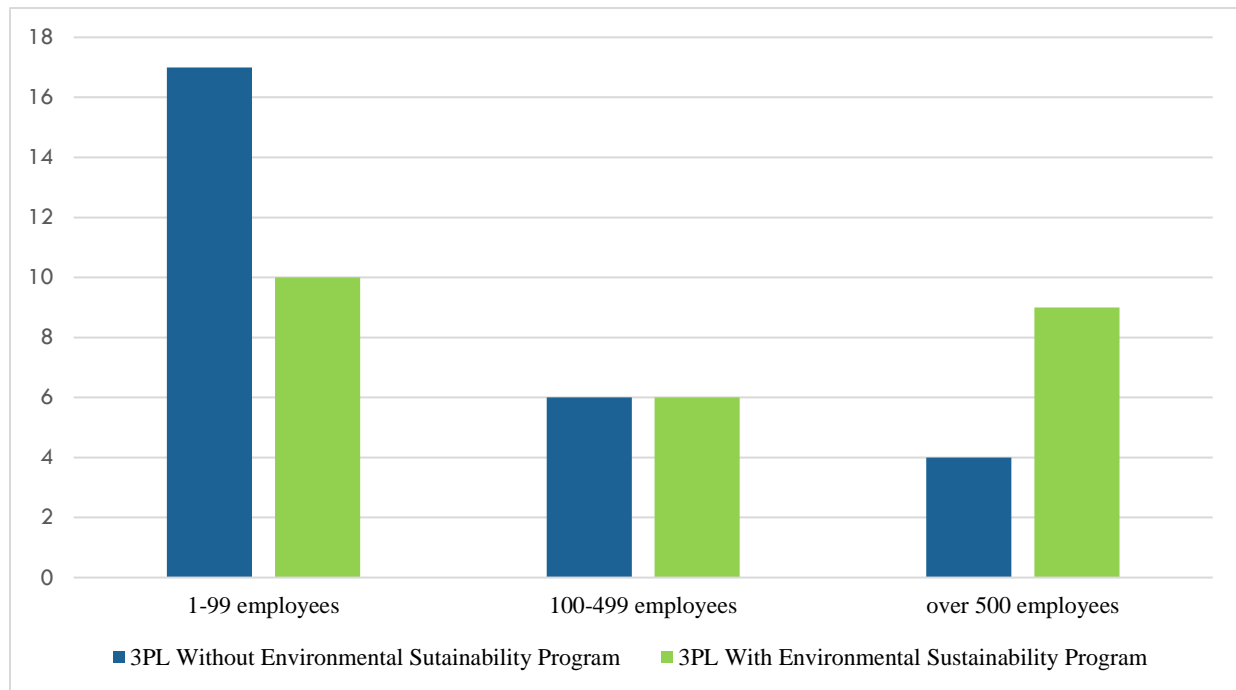
Figure 4.14 Company Size of 3PLs based on Employee Numbers in 3PL Companies vs Likelihood of Environmental Sustainability Program

In Figure 4.14 the findings show that the companies that were most likely to have environmental sustainability programs in place, were also those that were classified as over 500 employees or 'large' according to Statistics Canada. The breakdown was as follows: N= 52

Ten of 27 (37%) companies with less than 100 employees (small) had some type of environmental program in place. The medium size companies, classified as having 100-499 employees, numbered 6 of 12 (50%) with likelihood of program and finally, the large companies that are classified as having over 500 employees had 9 of 13 (69%) likelihood. There was 1 company for which employee data was unable to be obtained. That one company did have some type of environmental program in place.
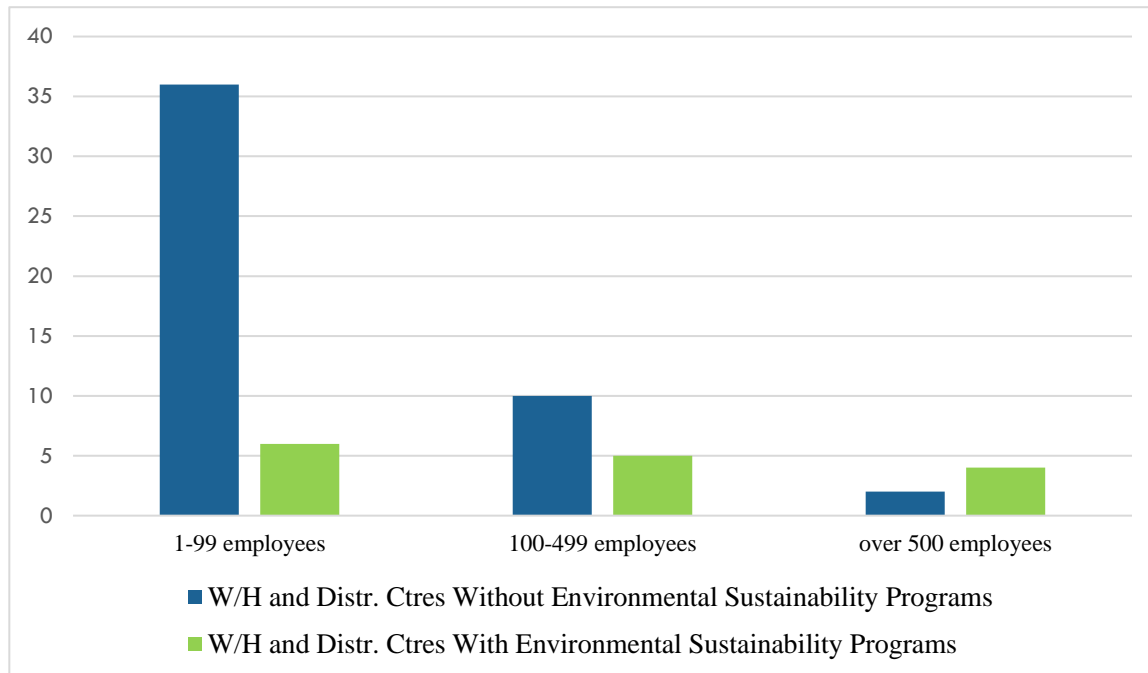
Figure 4.15 Company Size of Warehousing and Distribution Centres based on Employee Numbers vs Likelihood of Environmental Sustainability Program

Figure 4.15 indicates that most of the warehouses are classified as small; having less than 100 employees. The results were as follows: N=63

There were 42 of companies with less than 100 employees and only 6 (14%) had environmental sustainability programs in place. Medium size companies numbered 15 and 5 (33%) had a program in place. Large companies, those with over 500 employees, had the highest percentage 4 of 6 (67%) with some type of environmental sustainability program. There were 4 companies in this grouping for which employee data was not obtainable. Two of the companies did not have any environmental program in place and two did.

Once again the warehousing and distribution companies classified as large were more likely to have a program in place. This compares with the results found in those of third-party logistics which had a 69% likelihood. In recognizing this, Table 4.2 compares companies (both 3PLs and warehouse and distribution companies) having more than 500 employees with trade areas and the likelihood that an environmental sustainability program being implemented.

The prevalence of environmental sustainability programs in larger centres has already been acknowledged. The Insight 2008 study surmised that, "the difference can be chiefly ascribed to the availability of resources". With a larger workforce also comes greater responsibilities to ensure that a company, "provides the public and its workers with adequate, measureable and verifiable (where applicable) and timely information on the potential environmental health and safety impact of the activities of the enterprise, which could include reporting on progress in improving environmental performance" (OECD 2012). That being said, the emplyee base can also play a key role with ensuring that environmental programs are successfully opearating. In an Ernst & Young survey of 272 sustainability executives, they stated that one of the key trends that have been emerging is, "engaging employees as key stakeholders to embed sustainability in to the corporate culture" (Tabak 2014:89). It is not imperative to ensure executive buy-in for a program to be successful, but also the buy-in of every employee in the organization. Each employee plays a role in the outcome.

Trade Area of Company	3PL with environmental sustainability program and > 500 employees N=13	3PL without environmental sustainability program and > 500 employees N=13	Warehouse/Distribution Centre with sustainability program and > 500 employees N=6	Warehouse/Distribution Centre without sustainability program and >500 employees N=6
Local	0	0	0	0
Regional	0	1	0	0
National	2	1	1	2
Canada/US	3	2	2	0
International	4	0	1	0

Table 4.2 Comparison of Trade Area with 3PLs and Warehousing and Distribution Companies that have >500 Employees

The pattern that did emerge in table 4.2 was that 3PLs that had more than 500 employees and had a trade area into the US or internationally, were more likely to have environmental sustainability programs in place. This gives an indication consistent to the literature and the pattern that has emerged from the data analysis in figures 4.9, 4.10, 4.14 and 4.15.

It is more difficult to analyze a pattern in the warehousing and distribution portion of the table, as the sample size was much smaller.

4.2.6 Comparing Services Provided in Facilities with Existence of Environmental Sustainability Programs
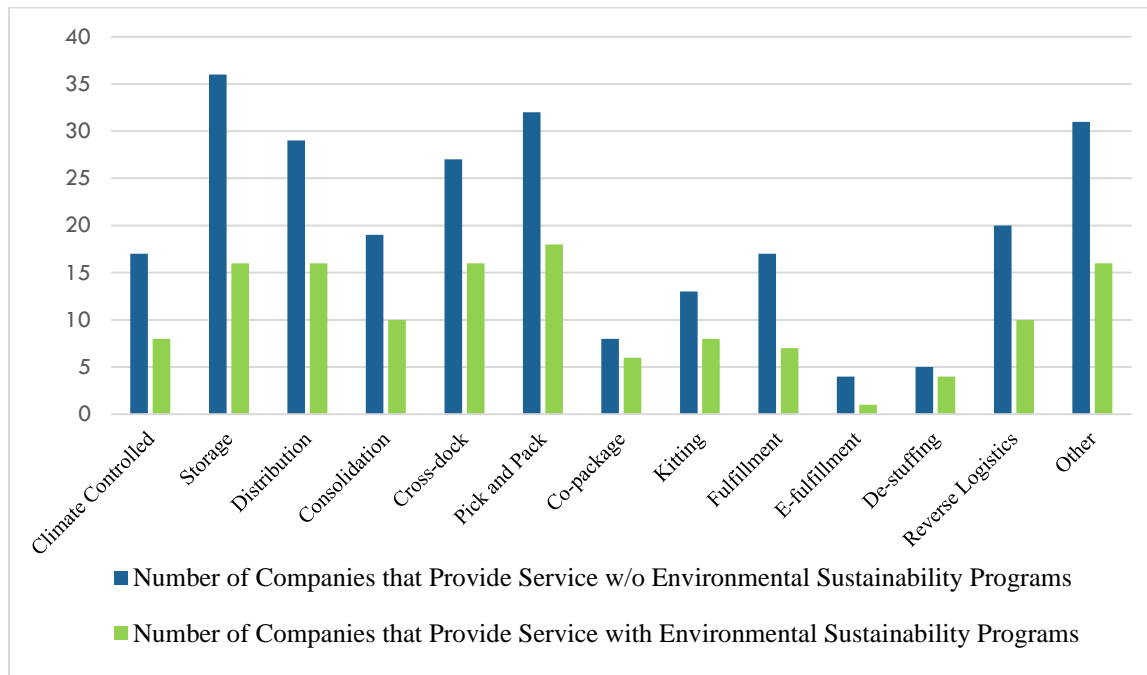
Figure 4.16 Services provided in 3PL Facilities vs Existence of Environmental Sustainability Programs

Figure 4.16 illustrates the most common services offered by third-party logistics. The companies' offerings were then compared to the prevalence of the company having an environmental sustainability program.

The results translated into percentages as follows: N=53

- Climate control- 8 of 17 (47%)
- Storage- 16 of 36 (44%)
- Distribution- 16 of 29 (34%)
- Consolidation- 10 of 19 (53%)
- Cross-dock- 16 of 27 (59%)
- Pick and pack- 18 of 32 (56%)
- Co-packaging – 6 of 8 (75%)
- Kitting- 8 of 13 (62%)
- Fulfillment- 7 of 17 (41%)
- E-fulfillment- 1 of 4 (25%)
- De-stuffing- 4 of 5 (80%)

- Reverse logistics- 10 of 20 (50%)
- Other- 16 of 31 (52%)

The data reflects the general findings that overall, 3PLs are already more likely to have an environmental sustainability program in place.

In a 2006 study done by Lieb and Lieb, they questioned 40 CEOs of the largest 3PL companies in North America, Europe and the Asia-Pacific region about company how they differentiate themselves from their competitors. They responded by mentioning the top four differentials were: their IT systems, broad geographic coverage, commitment to high quality customer service regardless of country and breadth of service (Lieb and Lieb 2009). There was no mention of using their position on environmental sustainability as a branding differential until Lieb and Lieb did another study in 2008-2009 asking the same companies as to why some of them implemented environmental sustainability programs. The top responses were: "a corporate desire to do the right thing, pressure from customers and a desire to enhance the company image" (Lieb and Lieb 2010:526).

■ Number of Companies that provide Service without Evnironmental Sustainability Programs
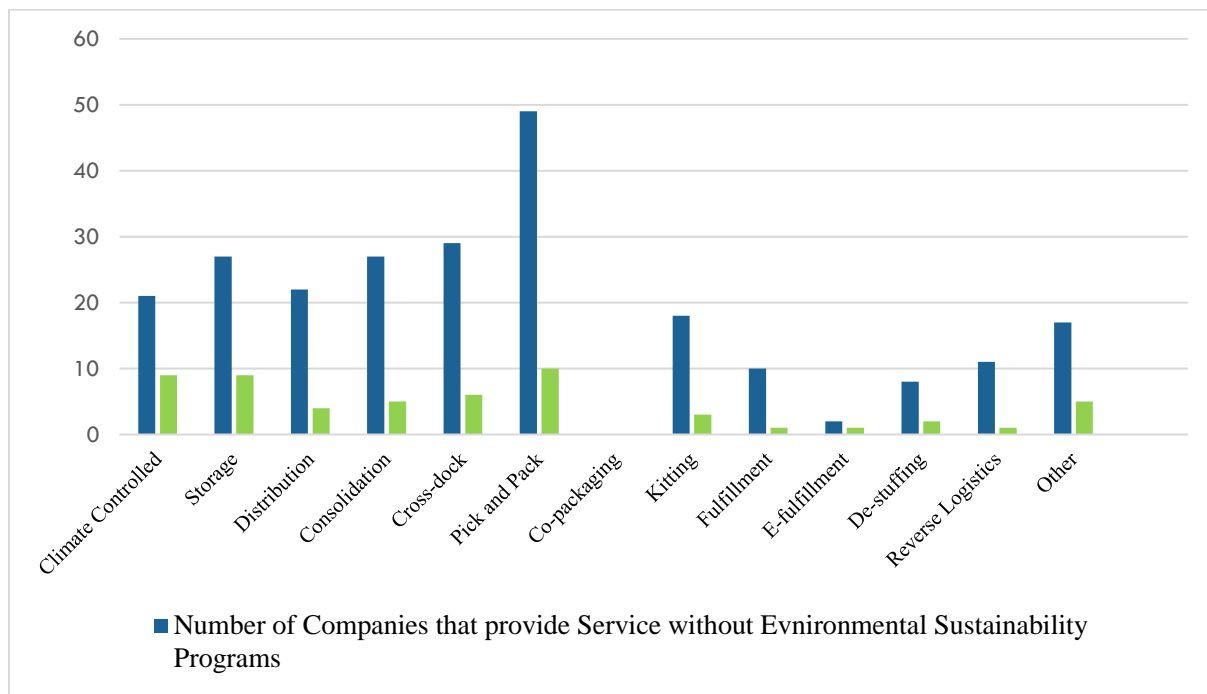
Figure 4.17 Services provided in Warehouse and Distribution Centres vs Existence of Environmental Sustainability Programs

Figure 4.17 illustrates the most common services provided by warehousing and distribution centres. The offerings were then compared to the likelihood that these warehouses and distribution centres would have environmental sustainability programs in place. When the results were expressed as a percentage, they were as follow: N=67

- Climate controlled- 9 of 21 (43%)
- Storage- 9 of 27 (19%)
- Distribution- 4 of 22 (18%)
- Consolidation- 5 of 27 (19%)
- Cross-dock- 6 of 29 (21%)
- Pick and pack- 10 of 49 (20%)
- Co-packaging- 0
- Kitting- 3 of 18 (17%)
- Fulfillment- 1 of 10 (10%)
- E-fulfillment- 1 of 2 (50%)
- De-stuffing- 2 of 8 (25%)
- Reverse logistics- 1 of 11 (9%)
- Other- 5 of 17 (29%)

In this sample, the data indicates that warehouses and distribution centres that offer climate controlled facilities are more likely to have an environmental sustainability program in comparison to all other value added services. The percentage was 43%, and with further analysis of the companies that were included in this service offering, 5 of the 9 companies offered cold storage in their service mix. This type of service requires a great deal of energy to ensure proper temperature maintenance. In a study done by Sehnem and Rossetto (2012), they looked at the impact of environmental sustainability strategies in the cold storage sector of Brazil. Their findings concluded that, "environmental strategies contribute to the attainment of competitive advantage for the company, but showed moderate correlation with the environmental and economic performance. The intangible resources (innovation capacity, intellectual capital, culture, reputation, quality management capacity) had a more intense impact on environmental performance" (Sehnem and Rossetto 2012:356-357). The environmental strategies had a positive impact on economic performance. The use of the Brazilian cold storage sector may not be an effective comparison to the Ontario sector, but it gives a foundation of understanding into the effects that envrionmental sustainability might have in this specific category of warehousing.

When we compare third-party logistics with warehousing and distribution centres, we can once again see that third-party logistics companies were more likely in this sample to have some type of environmental sustainability program in place. The only service offering in the warehousing/distribution centre sector that attained a high percentage was climate control. E-fulfillment scored the same percentage in both business categories, but no generalization can be made, as the sample size was only two for each.

4.2.7 Business Ownership of Third-Party Logistics and Warehousing and Distribution Centres.

Business ownership was one of the pieces of data asked for to understand the ownership level of the third-party logistics and warehousing and distribution companies. Since the information was asked for in the questionnaire, it was also gathered in the content analysis. The original hypothesis was that companies that were publically traded would have a higher incidence of having an environmental sustainability program in place. Even though the findings agree with this hypothesis, there was only a sample size of 5 that were in this category. The majority of companies were privately held and some had environmental sustainability programs implemented as well.
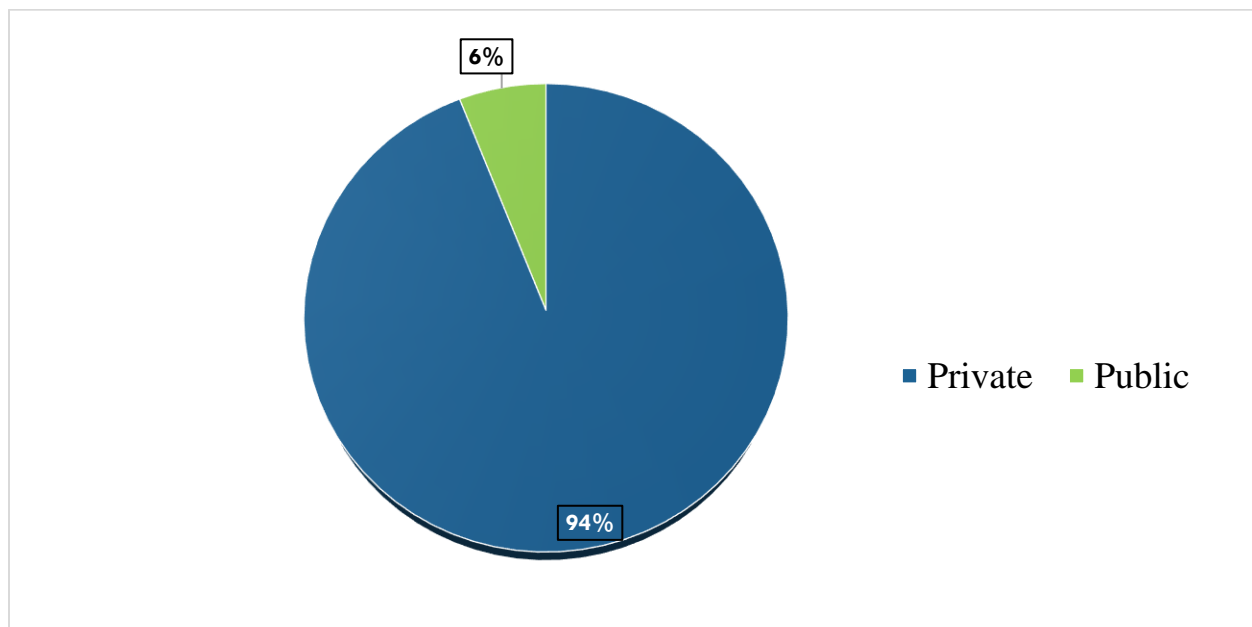
Figure 4.18 Percentage of 3PL and Warehousing/Distribution Centres that were public or privately held

Figure 4.18 indicates that the data for business ownership by third-party logistics, warehousing and distribution was all pulled together since the overwhelming majority of businesses in this sector are privately owned. Of the 120 businesses that were part of this research study, only 7 are publically held. The data also indicates that all but 1 publically held company had some type of environmental sustainability program in place, but the assumption certainly cannot be made that if a third-party logistics or warehousing and distribution centre is publically held than it will always have an environmental sustainability program in place. A larger sample size of publically held companies would be needed to determine if they are more likely to have an environmental sustainability program in place than privately held companies.

4.3 Results from Questionnaire Method

There were 120 companies that were emailed and used as the basis for the content analysis. Fifty-three of the companies were classified as third party logistics 67 were listed as warehousing and distribution centres. There was an initial count of 168 within these two categories, but there were 16 companies that overlapped and the remainder of the 32 were companies that either weighed more heavily on transport with facilities for cross-docking purposes only, or dealt with storage of raw or industrial materials. They were excluded from the study.

The invitation to participate in the questionnaire was sent by email send between the periods of April 25th to May 1st 2016. The surveys were sent to those that would best understand the area of sustainability within their companies. Due to the size of most of these companies, the contacts that were given in Leonard's Guide were the presidents or general managers of the firms. Follow-up emails and surveys were sent between the dates of June 4-6 and July 21-23 2016.

Unfortunately, the survey only brought in 6 responses even after the follow-ups. The response rate was therefore 5%. In discussing the very low response rate of the survey with Lisa M. Ellram, Rees Distinguished Professor of Supply Chain Management Farmer School of Business, Miami University, she said that it was not surprising as most warehousing operations are led by private individuals or are family owned. These companies may not have the knowledge nor the financial means to implement programs beyond recycling or emission control of their trucking

fleet. They are not likely to admit this so as not to come across as ignorant or uncaring to the environmental impact their business may be causing. There is also the element of not wanting to give up information that might be considered proprietary and impact any competitive advantage (Ellram 2016).

Analysis of the questionnaire cannot be done to any great certainty based on the very low response rate. The results should therefore be considered exploratory rather than explanatory. A summary of the responses is provided within **Appendix A.**

4.4 Discussion

The findings of the study highlighted the general statement that there is still a lot that can be done with regards to implementation of environmental sustainability programs in third-party logistics and warehousing/distribution centres, in Ontario. The highest percentage of environmental sustainability programs were found in third-party logistics companies with a 49% likelihood of implementation. The percentage dropped to 33% with warehousing/distribution centres. Objective 1 was able to be answered through this analysis.

The 2008 Supply Chain Monitor report indicated that the top 2 reasons that companies adopted environmental programs was, "compliance with regulatory constraints and improving the company's brand image" (Insight 2008). At present, there are not any regulations that govern the Ontario warehousing industry, with regards to emissions control, but in the climate change program that the Ontario government unveiled, it includes stricter controls and the launch of a cap and trade program. The programs that companies presently implement are all voluntary. The catalyst to persuade companies in implementing environmental sustainability programs then is based on selling of the benefits. The benefits may include: "differentiating service from competitors, increased sales, access to foreign markets, retention of existing customers, decreased distribution costs, enhanced risk management and improvement in the distribution process" (Industry Canada 2008).

The types of programs that are implemented are based on needs and the ability of the company to successfully integrate the process into the business strategy. As seen with the types of programs that were implemented in figures 4.5. 4.6, 4.7 and 4.8, the programs can be industry recognized

and requiring a total company by-in or can be department or area specific. The most popular industry recognized program as seen in figures 4.5 and 4.6 was SmartWay. SmartWay became the catalyst for many regulatory developments in the US, and in turn affected the transportation companies in Canada. Canada also became a member of SmartWay governance in 2012, but Canadian transport companies do not have to subscribe to the program. The program is purely voluntary in Canada. The program is extensive, in that modifications are required to be made to fleet engines to ensure that emission standards are being met, and driver training is also part of the program. There are limitations to idling time, reporting requirements and changes to routing and haulage. The meeting of these requirements grants certification and allowance to stay in the program and the use of the SmartWay logo on company documents. Using the SmartWay logo becomes one of the more important marketing advantages. For those transport companies who wish to access the US market, then implementation of SmartWay is now considered a norm.

SmartWay has also been the catalyst for the development of the "Heavy Duty Greenhouse Gas Rule" (EPA 2016) in the US, which measures GHG emissions and fuel consumption in long haul trucks and truck components. Canadian trucking companies would have to abide by these laws when travelling through the US. In addition to US federal laws, individual states implement their own emission laws, placing a greater need to subscribe to SmartWay. In reference Objective 2, it would be difficult to determine the level of program entrenchment by subscribing companies, based on the content analysis data. Based on the percentage of companies that have subscribed to a industry recognized environmental sustainability program (32% of third-party logistics companies and 21% of warehousing/distribution centres) then it can be said that these companies have programs that would be implemented at an executive level and incorporated within a business strategy. These environmental programs would also be maintained and audited on a regular basis to ensure compliance. The questionnaire would have allowed a greater understanding, as to the types of departments that would be affected by the programs and how many employees would be allocated to the maintenance.

The data to determine the most common environmental sustainability programs was fairly easy to collect. Most companies' websites advertised the programs they subscribe to in their company profiles or within their sustainability directive. As a result, figures 4.5, 4.6, 4.7 and 4.8 outline the most popular programs. The most surprising finding was that there was such a difference in

program subscription between third-party logistics and warehousing/distribution centres, which was the focus of Objective 6. Though, both had the element of storage and distribution, third-party logistics companies leaned more heavily onto programs that impacted their trucking division. They were more likely to subscribe to SmartWay as oppose to implementing an environmental sustainability program that would impact their warehousing division. The environmental programs that came up as most common in the warehousing and distribution sector, were those that are normally considered the most effectual to their buildings. These include: improvement in energy efficiency through temperature and lighting controls (Baker and Marchant 2010), reducing the need for packaging, implementing a recycling/waste management program (Mueller 1991), installation of electric or propane material handling equipment (Saxena 2013), reducing water usage and implementing a solar and thermal recovery program (Baker and Marchant 2010).

Objective 4 considered the impact of trade area, on the likelihood of having an environmental sustainability program in third-party logistics and warehousing/distribution facilities. The results from the content analysis found in figures 4.9 and 4.10 indicate that as the trade area widens, the likelihood of having an environmental sustainability program in this sample increases. The programs could have been in place before a trade area expansion, but without any supporting information, is difficult to conclusively determine if a trade area impacts the likelihood of program subscription.

The final research question looked at determining if the size of the facility impacted the likelihood of having an environmental sustainability program was in place. Figures 4.11 and 4.13 depict the analysis. Impact of size is not as evident in warehousing and distribution centres as it is with third-party logistics. By having a small sample size, this can only be an inference but there was a clear increase in likelihood of having an environmental sustainability program in facilities that were over 1 million square feet.

Chapter 5: Conclusion

5.1 Summary

The purpose of the study was to gain a better understanding of the environmental impact the warehousing industry has in Ontario and what inroads the companies have made, if any, to mitigate those impacts. Knowing that the industry is still in its infancy for environmental research, the study has concluded that there have been positive changes made to offset some of the environmental impacts that the industry creates. It also has highlighted that there is still much to be done. This research was able to give an overview to the areas that have been impacted and what environmental programs have been put into place. It highlighted the differences that occur in operations based on trade area, facility size, service offerings and business ownership. It showcased some ways that every warehousing facility can make a difference and that size of business or facility does not necessarily hinder implementing an environmental sustainability program

5.2 Contributions

The thesis provides an overview of the Ontario warehousing industry from an environmental perspective. It reviews 3PLs and warehouse/distribution companies' acceptance rate of environmental sustainability programs; provides findings as to what programs have been the most widely implemented and what categories of companies have embraced the concept of environmental sustainability. There has been no indication of this type of research being done from a scholarly perspective, in the province of Ontario, or within Canada. The paper bridges the information gap between the business and the academic field, giving insight into the need for possible future scholarly research.

The result of this study indicate that there is still much that can be done in the warehousing industry in Ontario, by way of environmental sustainability implementation. An obstacle remains convincing companies, not only of the environmental benefits of such a program, but also the financial and social benefits. Until companies can see the true benefits or savings to their

companies, without some type of outside influence or pressure, the acceptance and implementation rate of environmental sustainability programs will likely remain low.

5.3 Limitations of the Research

The research was largely limited to the type of information that could be gathered in the public forum. It is possible that companies did not disclose all information related to their environmental sustainability programs. It is also possible that they disclosed information they believed would present them in a favourable light.

In seeing the type of data that could have been gathered from the questionnaire, a more in-depth picture could have been created if more responses were received. An even deeper study could have been created if personal interviews were added to the questionnaire portion. A greater understanding of what holds back companies in implementing programs could have been collected, as well as the reverse side i.e. understanding what spurs a company in implementing a program. Is it strictly the idea of an executive, or is there a real push from within the supply chain? This is the kind of information can only be obtained from a detailed interview. Nevertheless, the data that was collected, has allowed a look into the industry and indicated what has been done in the realm of environmental sustainability. It has highlighted the inroads that have been made and the inroads yet to be done.

5.4 Areas for Further Research

Even though the questionnaire method was not very effective in acquiring data for this study, it has its merits and would have been effective if teamed with personal interviews and phone calls, as well as content analysis. Due to time constraints and apprehension of companies giving up information, the use of content analysis from the company websites garnered enough data to continue with the study. The data was effectual enough to allow analysis and determine the answers to the research objectives. For future research, the study could be expanded to include all provinces in Canada. Analyzing the outcomes from one province to another could give insight to areas that would best benefit from environmental sustainability programs, or give indication as to how similar the industry is throughout Canada.

Other studies could be defined by concentrating on specific elements that were discussed in this study; i.e. the impact of trade area, the impact of facility size, the impact of business segment or company size on the likelihood of having an environmental sustainability program in place. Through personal interviews and in-person questionnaires, one could establish a very good understanding as to the process that companies go through when deciding to establish any environmental sustainability program.

A final possible research study could focus on policy as a catalyst for companies in establishing environmental sustainability programs. As was seen in the data that pinpointed a possible connection to the likelihood of having an environmental program at the international trade area level, the research could study the countries that are within the reach of those Canadian companies. Many of these companies were Canadian divisions of international parent companies. The analysis would determine if regulations and policies in the parent company's home country had an impact on corporate policy for environmental sustainability throughout the company.

Even though the warehousing industry in Ontario hasn't had a lot of study done on it, with regards to environmental impact, the hope is that studies like this bring attention to this area. Warehousing is an expanding industry in Ontario and has an environmental impact like any other industry. Allowing industry members access to solid environmental research can only benefit the industry as a whole. Any decisions that the industry makes that impacts the environment in a positive way will only ensure a more sustainable future for everyone.

Appendix A

Question 1**. Does your company have an environmental sustainability program in place?**

Respondent   Answer

1	Did not have
2	Did have
3	Did have
4	Did have
5	Did not have
6	Did not have

The answer to question one were split in half, which was beneficial to see if the answers to both possibilities follow any patterns established within the content analysis findings.

Question 2**. Does your company have an industry recognized environmental sustainability program?**

Respondent   Answer

1	Did not have
2	Did have
3	Did have
4	Did have
5	Did not have
6	Did not have

Once again, this question was split in half, in that 50% of respondents said they had an industry recognized program in place.   When we compare it to figures 4.1-4.4, the 50-50 split is the closest comparison to figure 4.1. The sample size from the questionnaire is too small to allow any generalities to be derived. A larger sampling would be required to see if the pattern begins to mimic that of the analysis in the content component.

Question 3. **What is/are the name/s of the environmental sustainability program/s your company subscribes to?**

Respondent   Answer

1	Did not have
2	Did not have
3	Have ISO 14001
4	Have ISO 14001 and LEED
5	Did not have
6	Did not have

Of the 6 respondents, 2 companies had implemented industry recognized environmental sustainability programs. When comparing these answers to figures 4.5 and 4.6 the analysis shows that both ISO 14001 and LEED were programs that were being implemented, but not at a high percentage.

Question 4. **What customized/in-house program have you implemented?**

Respondent   Answer

1	Did not have any programs implemented
2	Energy efficiency, product and packaging recycling/re-use and reduced packaging/increased use of biodegradable packaging
3	Energy efficiency, green procurement, product and packaging recycling/re-use, reduce packaging/increased use of biodegradable packaging, reduction in GHG emissions, waste reduction, water conservation, use of carbon calculator , tree planting, spring clean-up in community
4	Energy efficiency, green procurement, product and packaging recycling/re-use, reduced packaging/increased use of biodegradable packaging, reduction in GHG emissions, waste reduction, water conservation processes, use global best practices, use of carbon calculator
5	Did not have any programs implemented
6	Did not have any programs implemented

Subscribing to an energy efficiency lighting program and having a recycling/waste management program were the more common programs that were mentioned in the content analysis. Two of the respondents had the full complement of environmental sustainability programs implemented which would be consistent with having an ISO 14001 registration. ISO 14001 encompasses all areas of business, and would require all levels of the company to subscribe and adhere to the requirements of the standard to maintain accreditation.

Question 5. **Who champions your environmental sustainability program?**

Respondent   Answer

Respondent	Answer
1	Did not respond to answer
2	Championed by president
3	Championed by an overall department, and each business unit has an employee or committee (based on size of business unit)
4	Championed by department and each area has an employee lead
5	Did not respond
6	Did not respond

The response to this question did not have any comparative data in the content analysis, as this type of information was not publically available.   The answer stating that the president of the company or a dedicated department/committee championed the environmental sustainability program was not unexpected, the catalyst for many companies making the decision to implement an environmental sustainability program is done at the executive level. As previously stated, the key to achieving desired collaborative breakthroughs is to establish strong managerial commitment to supply chain management (Fawcett et al. 2006; Akkermans et al. 1999; Lummus et al. 1998). The programs that are implemented at the executive level tend to be more entrenched within the business strategy of the company and throughout the various departments. There is a greater by-in by all the employees at all levels of the company.

Question 6. **Please name the departments in your company that are involved in the environmental sustainability program?**

Respondent   Answer

1	Did not respond
2	Warehouse operations, returns, regulatory affairs
3	Corporate office, warehouse operations, transportation and logistics, regulatory affairs/legal department, returns, human resources, health and safety, security
4	Corporate office, warehouse operations, fleet management, human resources, procurement, finance and legal, real estate
5	Did not respond
6	Did not respond

This answer ties in to the justification of question 5. Companies that have an environmental sustainability program implemented at an executive level will tend to have a program that is more deeply entrenched throughout the organization. The departments that were impacted at the respondents' companies involved: human resources, procurement, transportation, the entire warehousing operations, reverse logistics departments, governed their regulatory/legal affairs, security and real-estate departments. Regulatory/legal affairs would have the greatest concern to ensure that all regulations were being abided by. This would include, not only domestic laws, but those of foreign countries that the company does business in, or has branch facilities.

Question 7. **How long has your company had the program/s in place?**

Respondent   Answer

1	Did not respond
2	Less than 2 years
3	More than 5 years but less than 10 years
4	More than 5 years but less than 10 years
5	Did not respond
6	Did not respond

The response to this question could not be compared to any information from the content analysis, since this information was not always publically available. The respondents' answers indicate that the implementation of the environmental sustainability programs has been fairly recent, with no programs exceeding the 10 year mark. These findings follow the 2006 survey done by Leib and Leib, in which CEOs were asked how they would strengthen their brand and differentiate themselves from their competitiors; establishing an envrionmental sustainability program was not even a consideration.

In the findings of Murphy et al. (1995) the study indicated that, "larger firms were more likely to have formal or written environmental policies than were smaller firms, and to have had these policies in place for a longer period of time" (Murphy et al. 1995:15).

In the 2008 study done by Insight, 36% of the companies that were asked, "have been taking environmental concerns on board for more than 5 years, almost 40% have been doing so for less than 3 years. Nevertheless, how long the practices have been in place varies considerably from one country to the next" (Insight 2008).   The study having been done in 2008, with respondents stating that their programs were in place for the last 5 years, brings the timeline into the early 2000s. This only confirms how recent the embracing of environmental sustainability programs by companies has been.

Question 8. **What were the reasons for implementing an environmental sustainability program?**

Respondent   Answer

1	Did not respond
2	Desire to be leader in sustainability, executive leadership
3	Corporate image, cost reduction, desire to leader in sustainability, environmental regulations, executive leadership, minimize liability, new market opportunities, desire to do the right thing, expectations from supply chain partners
4	Corporate image, desire to be leader in sustainability, environmental regulations, executive leadership, pressure from supply chain partners, desire to be a corporate citizen
5	Did not respond
6	Did not respond

The answer to this question follows the reasons given for implementing environmental sustainability programs as found in Table 2.1. The table compares three different studies that were done and gives a listing of the most frequent and common reasons for implementing environmental sustainability programs. Some of the reasons include: desire to be a leader, gaining a competitive advantage and improving customer and corporate image (McKinnon et al, 2015). When a comparison is done of the respondents' answers to those in Table 2.1, there is no difference. The level of importance may have changed, but the reasons for implementations have not.

Question 9. **Are there any external organizations involved in your environmental sustainability program?**

Respondent   Answer

1	Did not respond
2	No
2	Yes
3	Yes
4	Did not respond
5	Did not respond

This answer indicated that some companies had a formal organization influencing or aiding them with their environmental sustainability program outside of the company. Availability of this type of information from a company website would not be consistently available, so no comparison was able to be made, with the information from the content analysis. The companies that have used outside organizations to aid with their programs were publically traded companies, as will be seen by responses to Question 17.

As mentioned in objective 5, Many small-and- medium size enterprises (SME) suppliers have difficulty meeting the emerging environmental and social standards of their customers because of limited financial funds, lack of human resource expertise, and difficulties identifying and acting on relevant information (Lee and Klassen 2008; Moore and Manring 2009; Temomi 2010). Unfortunately, most of the time, the drivers in the supply chain are the large firms who can afford the implementation of strategic environemental programs since the intial outlay costs tend to be great (Lee and Klassen 2008).

Question 10. **Which external organizations are involved in your environmental sustainability program?**

Respondent   Answer

1	Did not respond
2	No external organizations
3	Non-government Organization (NGO)/Association, outside consultant
4	Industry Association, outside consultant
5	Did not respond
6	Did not respond

It is not surprising that the 2 companies that have an ISO 14001 environmental sustainability program in place, would have an outside consultant involved in their program. This is a very detailed and difficult program to implement if a company does not have its own knowledge base. A consultant would advise at all stages of implementation, and once implemented, assess its success by aiding with ongoing audits. When the Insight (2008) study looked at third-party involvement with companies' environmental sustainability programs, the most common responses were: "suppliers were most involved (76%), subcontractors (56%), logistical providers (47%)" which would be considered part of the upstream supply chain. Consumers' involvement (36%); government involvement (41%); associations (20%) and organizations (24%) (Insight 2008). Because of the nature of the programs that were mentioned by the respondents in the thesis questionnaire; ISO 14001 and LEED, the certification nature of the programs would require some assistance to either train in-house staff to administer the programs or ensure that outside auditing is done to validate compliance.

Question 11. How would you rate the effectiveness of your environmental sustainability program?

Respondent   Answer

1	Did not respond
2	Somewhat effective
3	Very effective
4	Very effective
5	Did not respond
6	Did not respond

The respondents answered that they found the effectiveness of their sustainability program to be either somewhat or very effective.   In a study done by Parisi (2013), she looked at the perceived success an effectiveness of sustainability programs in large European companies. It was thought that, "both strategic and operational efforts contribute to an organization's ability to attain strategic goals and to its performance" (Parisi 2013:72). This has also been the notion in studies done by: Flamholtz 1990; Flamholtz et al. 1985; Haas 2010; and Banerjee 2001. The Parisi study continued looking at the effectiveness of the companies' organizational strategy and stucture (Chenhall 2006) as well as planning abilities (Chenhall 2005). More specifically, "look at the belief that the alignment and commitment of middle managers to sustainability strategies as defined by the upper echelons have a relevant impact on the company's social and environmental performance" (Parisi 2013:72). The overall results of the Parisi study determined that, top management support appears to be a critical element in determining the effectiveness of sustainable Strategic Performance Management Systems (SPMS) and their structural and social alignment. A Strategic Performance Management Systems are defined as, a business strategy that helps an organization set its goals and ensures that goals are being met (Clear-Point Strategy- Ted Jackson 2015). "The idea is that if you communicate simple, realistic, and appropriate guidelines and expectations, you can better ensure that your employees will adopt and nurture your goals" (Clear-Point Strategy- Ted Jackson 2015). The secondary results of the Parisi study determined that there was, "a non-significance in the impact of middle managers knowledge and involvement in sustainability issues" (Parisi 2013:87). Even though, " top management may consider sustainability a key issue, middle mangement clearly lacks

knowledge about the sustainability guidelines companies apply and do not feel involved in their implementations" (Parisi 2013:87). It then can be assumed that middle managers only need, 'to be aware of a company's long-term goals, and their results and prompt feedback will correct any misrepresentations and cause only small errors" (Parisi 2013:87). Keeping this in mind to the application to this thesis, the answers of the environmental programs being "somewhat" or "very effective" may be explained as to the position of the persons answering the question. This will be determined by Question 15 in this survey.

Once again, this was not information that could be compared to in the content analysis, since this information was not consistently available. All companies with some type of environmental sustainability program would have to have a formal sustainability report published to allow for comparison of data at this level. Most private companies wouldn't see the need or have the means to publish a report like this, unless they considered this data as giving them a competitive edge. Many companies that did have a published sustainability report were those that were publically owned or very large international companies; i.e. CN, Panalpina and Schenker.

Question 12. **What is the reason for not implementing an environmental sustainability program in your organization?**

Respondent   Answer

1	Lack of information, no real need for program
2	Have program
3	Have program
4	Have program
5	High cost, lack of information, no real need for program
6	High cost, too complex to implement

The answers that were given to this question are quite consistent with those that are typically given as reasons for not implementing an environmental sustainability program. In a 2008 Insight Report done by the Supply Chain Monitor titled "How mature is the Green Supply

Chain?" the top three reasons given for not implementing a program was: lack of information, too complex to implement such a system, and lack of return on investment (Insight 2008).

Question 13. **Will your organization be implementing an environmental sustainability program in the future?**

Respondent   Answer

1	No
2	Have program
3	Have program
4	Have program
5	No
6	No

For those companies that did not have a program in place, there was no indication of doing so in the near future, or that which was known to them.   It has been stated that, "Compliance with government regulations is a key external driver and the legally required must-do task. Regulations large and small will constrain decisions and options. Some are indirect, such as recent US federal regulations mandating greater light bulb efficiency that alter the products available for purchase. Others are direct, such as the carbon cap-and-trade schemes deployed in Europe, California and Australia" (Price Waterhouse Cooper 2015-2016:5). The effects of the Ontario cap-and-trade may well be the catalyst that spurs some of the companies that said they would not be implementing an environmental sustainability program, to possibly reconsider their positions.

There was no corresponding information in the content analysis that could be used for comparison.

Question 14. – **What is the time expectation for implementation?**

This was not answered by any of the respondent as 3 had a program in place and 3 did not have any plans for implementation

Question 15. **Job title of person completing questionnaire:**

Respondent   Answer

1	Logistics Manager
2	President
3	Manager of Corporate Affairs
4	Global Lead
5	Logistics Manager
6	Logistics General Manager

This was consistent with the email/questionnaire send, since the targeted employees were at a general manager level or higher.

When we cross tab the responses with those in question 11, the results are similar to the findings in the Parisi study. The upper management respondents either answered their environmental sustainability programs were 'somewhat effective' or 'very effective'. The comparison that would have completely supported the Parisi study findings would have been if middle management had been asked the same question. Would the responses have been the same? Additional queries would have to be made to research this information.

Question 16. **What is your company classification?**

Respondent   Answer

1	Local
2	International
3	International
4	International
5	Regional
6	National

These answers run consistent with the findings in the content analysis. In figures 4.9 and 4.10, the likelihood of a locally classified third-party logistics or warehouse/distribution company having an environmental sustainability program in place was 36% and 18%, respectively. Small-Medium- Sized companies have also tended to see themselves as playing, "minor or insignificant roles in their environmental impact" (Friedman and Miles 2002:324). The percentage increased to a likelihood of 83% and 67%, respectively, if a 3PL or warehouse/distribution company was classified as international.

Question 17. **Warehouse facility is classified as:**

Respondent   Answer

1	Public
2	Leased
3	Public
4	Public
5	Public
6	Private

The responses to this question are not consistent with the findings of figure 4.18. Only 6% of companies in the content analysis were publically traded companies, the remainder described

themselves as privately owned. The only consistency with the content analysis findings would be the higher incident of publically traded companies having an environmental sustainability program in place. In the content analysis all but 1of the publically traded companies did have an environmental sustainability program implemented. In the respondents' answers 2 of the 4 had a program in place when you cross tab the answers with question 1. The answer of 'leased' would refer to the space being used by another company for warehousing or distribution purposes, even though the logistics company is either private or publically owned.

Publically traded companies seemed to be the most open to returning the questionnaire. This may have been based on the information that already is available on the web, and disclosure of information is a requirement. The other possibility is that the predominant grouping of respondents were classified as international companies. These companies tend to have very extensive environmental programs in place and considered leaders in their field. This is something that they would be proud of and a very good competitive advantage for them. Corporate image is important and their 'brand' would hold much clout in their industry.

Question 18. **What service offerings does your facility provide?**

Respondent   Answer

1	Consolidation, cross-docking, distribution, storage, fulfillment, pick and pack, reverse logistics and sortation
2	Distribution, storage, fulfillment and pick and pack
3	Bonded, Climate control, consolidation, cross-dock, reverse logistics, storage, tran-shipment/break-bulk, packaging, pick and pack
4	Consolidation, cross-dock, distribution, pick and pack, packaging, kitting, storage
5	Consolidation, cross-dock, fulfillment, reverse logistics, kitting, packaging, storage
6	Consolidation, cross-dock, de-stuffing, pick and pack, repackaging, storage

The answers to this question would be compared to the findings in figures 4.17 and 4.18. The data analysis in the figures indicated that overall, 3PLs are more likely to have an environmental sustainability program in place. In a 2006 study done by Lieb and Lieb, having a breadth of service was a means of differentiating oneself from the competition (Lieb and Lieb 2009). Respondents one and three had the largest selection of services, but no other correlation can be made from just this information. The ability to conclude the nature of the business, be it 3PL or warehousing/distribution, cannot be done.

Question 19. **Size of warehouse in square footage:**

Respondent   Answer

1	Less than 49,999 sq. ft.
2	Less than 49,999 sq. ft.
3	More than 1 million sq. ft.
4	More than 1 million sq. ft.
5	50,000-139,999 sq. ft.
6	400,000- 999,999 sq. ft.

The answers to this question compare to the findings in figure 4.11 and 4.13. The likelihood of a third-party logistics company having an environmental sustainability program was 0% and that of a warehousing/distribution centre being 25%. Respondents 2-4 all stated that their companies had environmental sustainability programs in place. When analyzing the likelihood of company whose facilities are over 1 million square feet, the percentage of implementation increases to 67% for 3PLs and 38% for warehouse and distribution companies.

Appendix B

Abbreviations, Definitions and Descriptions

Climate Controlled	This is storage that controls the entire climate in a facility. There is specific standard that is maintained which includes humidity, temperature (10c-27c), dust and pests (Suddath 2016). In cold storage the temperature is maintained between -23c to 10c based on the product and length of storage (Modern Materials Handling 2012).
Co-packing	Is "the outsourcing of packaging a product" (PACA Foods 2015).
Cross-dock	"Is a practice in logistics of unloading materials from an incoming semi-trailer truck or railroad car and loading these materials directly into outbound trucks, trailers, or rail cars, with little or no storage in between" (Wikipedia 2016).
De-stuffing	De-stuffing is defined as 'unloading' cargo either from container or any other mode (How to Export Import.com 2016).
FleetSmart	'FleetSmart offers free practical tools and advice on how energy-efficient vehicles and business practices can cut fleet operating costs, reduce harmful vehicle emissions, improve productivity and increase competitiveness' (Government of Canada 2015). Canadian version of SmartWay.
Fulfillment/E-fulfillment	It is the process defined as, "the steps involved in receiving, processing and delivering orders to end customers" (Bulger 2013).
GHGs	Green House Gases

ISO 14001	The ISO 14000 family of standards provides practical tools for companies and organizations of all kinds looking to manage their environmental responsibilities. ISO 14001:2015 sets out the criteria for an environmental management system and can be certified to. It maps out a framework that a company or organization can follow to set up an effective environmental management system. It can be used by any organization regardless of its activity or sector. Using ISO 14001:2015 can provide assurance to company management and employees as well as external stakeholders that environmental impact is being measured and improved (ISO 2016).
Kitting	Is the process where, "individually separate but related items are grouped, packaged, and supplied together as one unit" (BusinessDictionary.com 2016).
LEED	Leadership in Energy and Environmental Design
Pick and Pack	"It entails processing small to large quantities of product, often truck or train loads and disassembling them, picking the relevant product for each destination and re-packaging with shipping label affixed and invoice included" (Wikipedia 2016).
Reverse Logistics	Is the process of, "all operations related to the reuse of products and materials" (Wikipedia 2016).
SmartWay	SmartWay is a transport partnership launched by the EPA in 2004. "It has been administered by Canada's Department of Natural resources since 2012" (Government of Canada 2016). The program helps the freight transportation sector improve supply chain efficiency. SmartWay reduces transportation-related emissions that affect climate change, reduce environmental risk for companies and increase global energy security (EPA United States Environmental Protection Association 2016).
Storage	The simple meaning is a, "space where you put things when they are not being used" (Merrion-Webster Dictionary 2016).

Warehousing, Distribution
and Third-Party Logistics

Distribution Centre is, "a facility that is usually smaller than a firm's main warehouse and is used for receipt, temporary storage, and redistribution of goods according to the customer orders as they are received.
Also called branch warehouse or distribution warehouse" (BusinessDictionary.com 2016).

Third-Party Logistics is, "a provider of outsourced logistics Warehousing, Distribution and Third-Party Logistics services. Logistic services encompass anything that involves management of the way resources are moved to the areas where they are required" (TechTarget 2016).

Warehousing Centre- "Performance of administrative and physical functions associated with goods and materials. The functions include receipt, identification, inspection, verification, putting away, retrieval for issue, etc". (BusinessDictionary.com 2016).

Appendix C- Warehousing Survey

1. Does your company have an environmental sustainability program in place?
   - o Yes
   - o No

   If 'yes'------→ go to question 2. -----→ If 'no' go to question 12.

2. Does your company have an industry recognized environmental sustainability program?
   - o Yes
   - o No

   If 'yes'-------→ go to question 3. -----→ If 'no' go to question 4.

3. What is/are the name/s of the environmental sustainability program/s your company subscribes to?

   _____
   _____
   _____
   _____

4. What in-house program have you implemented?
   Please check all that apply:
   - o Energy efficiency
   - o Green procurement practices
   - o Product and packaging recycling/re-use
   - o Reduced packaging/increased use of biodegradable packaging
   - o Reduction of greenhouse gas emissions
   - o Waste reduction
   - o Water conservation processes
   - o Other:_____

     _____
     _____
     _____

5. Who champions your environmental sustainability program?
   - o Employee
   - o Committee
   - o Department

6. Please name departments (e.g. global procurement, human resources….) in your company that are involved in the environmental sustainability program?

_____

_____

_____

_____

7. How long has your company had the program/s in place?

   o Less than 2 yrs.
   o More than 2 yrs. but less than 5 yrs.
   o More than 5 yrs. but less than 10 yrs.
   o More than 10 yrs.

8. What were the reasons for implementing an environmental sustainability program? Please check all that apply.
   o Competitors' actions
   o Corporate image
   o Cost reduction
   o Desire to be leader in sustainability
   o Environmental regulations
   o Executive leadership
   o Minimize liability
   o New innovation
   o New market opportunities
   o Pressure from supply chain clients
   o Profit opportunities
   o Other_____

9. Are there any external organizations involved in your environmental program?
   o Yes
   o No

   If 'yes' --→ go to question 10. ----→if 'no' go to question 11.

10. Which external organizations are involved in your environmental program? Please check all that apply.
    - o Clients (business to business)
    - o Customers (business to end customer)
    - o Industry Association
    - o Non-Government Org (NGO)/Associations
    - o Subcontractors
    - o Suppliers
    - o Third party logistics providers
    - o Other

11. How would you rate the effectiveness of your environmental sustainability program?
    - o Very effective
    - o Somewhat effective
    - o Neither effective nor not effective
    - o Somewhat not effective
    - o Not very effective

    Please go to question 15.

12. What is the reason for **not** implementing an environmental sustainability program into your organization?

    Please check all that apply.
    - o High cost
    - o Lack of information
    - o No real need for program
    - o No return on investment
    - o Not our responsibility
    - o Too complex to implement
    - o Other: _____
      _____
      _____
      _____

13. Will your organization be implementing an environmental sustainability program in the future?
    - o Yes
    - o No

    If 'yes'---→ go to question 14. -----→if 'no' go to question 15.

14. What is the time expectation for implementation?
    o   Less than 12 months
    o   More than 12 months but less than 2 years
    o   More than 2 years but less than 5 years
    o   More than 5 years

15. Job title of person completing questionnaire:

    _____

16. What Is your company classification:
    o   Local
    o   Regional
    o   National
    o   International

17. Warehouse facility is classified as:
    o   Public
    o   Private
    o   Leased

18. What service offering does your facility provide?
    Please check all that apply
    o   Automated
    o   Bonded
    o   Climate-controlled
    o   Consolidated centre/transit warehouse
    o   Cross-dock centre
    o   Distribution Centre/HUB
    o   Finished goods storage
    o   Fulfillment centre/pick and pack
    o   Reverse logistics centre
    o   Sortation centre
    o   Transhipment or break-bulk centres
    o   Other (Please describe)

        _____

19. Size of warehouse by square footage:
- o   Less than 49,999 sq. ft.
- o   50,000 to 139,999 sq. ft.
- o   140,000 to 199,999 sq. ft.
- o   200,000 to 399,999 sq. ft.
- o   400,000 to 999,999 sq. ft.
- o   More than 1 million sq. ft.

20. Would you like to get a copy of the final research report?
- o   Yes
- o   No

Appendix D- Raw Data

THIRD PARTY LOGISTICS	SUSTAINABILITY PROGRAM EXISTS		INDUSTRY RECOGNIZED PROGRAM	
	YES	NO	YES	NO
BYEXPRESS		1		1
ADCO	1		1	
ADLI		1		1
AGILITY LOGISTICS INC	1		1	
ACCURISTIXS		1		1
ALL-CONNECT LOGISTICAL SERVICES INC		1		1
APPROVED CAN TRANSPORT INC		1		1
BELLVILLE RODAIR INTERNATIONAL		1		1
BERNHAVEN TRANSPORT SVC		1		1
BUCKLAND CUSTOMS BROKERS LIMITED	1			1
CANADIAN FASTFRATE	1			1
CARRIER ONE		1		1
CAVALIER TRANSPORT *	1			1
CEVA LOGISTICS	1		1	
CHALLENGER	1		1	
CITY TRANSFER		1		1
CONEX FREIGHT		1		1
CORNWALL WAREHOUSING LTD		1		1
D A R T Logistics	1		1	
DIRECT SERVICE NETWORK	1		1	
EMBLEM LOGISTICS	1			1
FARROW LTD		1		1
FRASER DIRECT DIST. *	1			1
IMPACT LOGISTICS *		1		1
KRG LOGISTICS	1			1
KEELE W/H AND LOGISTICS		1		1
LAKESIDE LOGISTICS, INC.	1		1	
LASER TRANSPORT LOGISTICS	1		1	
LEGACY SUPPLY CHAIN SERVICES	1		1	
LESLEE INC		1		1
LOMAS LOGISTICS *		1		1
MBX LOGISTICS		1		1
MANITOULIN W/H AND DIST. *	1		1	
MCKENNA LOGISTICS CENTRE		1		1
METRO LOGISTICS	1			1
NFI CANADA	1		1	
NATIONAL SHUNT SERVICES	1			1
NU-ERA	1		1	
NU QUEST INTEGRATED		1		1
OTTAWA LOGISTICS		1		1
PANALPINA INC	1		1	
QUAD LOGISTICS	1			1
SCI LOGISTICS		1		1
SGT 2000		1		1
SCHENKER LOGISTICS	1		1	
SHERWAY GROUP		1		1
TITANIUM LOGISTICS		1		1
TOTALLINE TRANSPORT		1		1
UNIVERSAL LOGISTICS		1		1
VISION TRANSPORT SYSTEMS	1		1	
VITRAN / AXIOM WH/CLARK WH	1		1	
WILLSON INTERNATIONAL		1		1
XTL LOGISTICS	1		1	
COLUMN TOTALS	26	27	17	36

THIRD PARTY LOGISTICS	PROGRAM TYPE								
	SMARTWAY	LEED	FLEETSMART	ISO 14001	GR. VEH. PR.	BATT. FORKLIFTS	LIGHTING RETROFIT	RECYCLING	INDEPENDENT
BYEXPRESS									
ADCO	1								
ADLI									1
AGILITY LOGISTICS INC				1		1	1	1	1
ACCURISTIXS									
ALL-CONNECT LOGISTICAL SERVICES INC									
APPROVED CAN TRANSPORT INC									
BELLVILLE RODAIR INTERNATIONAL									
BERNHAVEN TRANSPORT SVC									
BUCKLAND CUSTOMS BROKERS LIMITED									1
CANADIAN FASTFRATE					1		1	1	1
CARRIER ONE									
CAVALIER TRANSPORT *							1		1
CEVA LOGISTICS	1			1	1	1	1	1	1
CHALLENGER	1	1							1
CITY TRANSFER									
CONEX FREIGHT									
CORNWALL WAREHOUSING LTD									
D A R T Logistics	1								
DIRECT SERVICE NETWORK	1								
EMBLEM LOGISTICS						1			
FARROW LTD									
FRASER DIRECT DIST. *							1	1	1
IMPACT LOGISTICS *									
KRG LOGISTICS									1
KEELE W/H AND LOGISTICS									
LAKESIDE LOGISTICS, INC.	1								1
LASER TRANSPORT LOGISTICS	1								
LEGACY SUPPLY CHAIN SERVICES	1						1	1	1
LESLEE INC									
LOMAS LOGISTICS *									
MBX LOGISTICS									
MANITOULIN W/H AND DIST. *	1		1						1
MCKENNA LOGISTICS CENTRE									
METRO LOGISTICS							1	1	1
NFI CANADA	1						1		1
NATIONAL SHUNT SERVICES									1
NU-ERA	1								
NU QUEST INTEGRATED									
OTTAWA LOGISTICS									
PANALPINA INC				1			1	1	1
QUAD LOGISTICS								1	1
SCI LOGISTICS									
SGT 2000									
SCHENKER LOGISTICS	1	1		1		1	1	1	1
SHERWAY GROUP									
TITANIUM LOGISTICS									
TOTALLINE TRANSPORT									
UNIVERSAL LOGISTICS									
VISION TRANSPORT SYSTEMS	1								
VITRAN / AXIOM WH/CLARK WH	1				1		1	1	1
WILLSON INTERNATIONAL									
XTL LOGISTICS	1		1						
COLUMN TOTALS	15	2	2	4	3	4	11	10	19

THIRD PARTY LOGISTICS	TRADE AREA					OWNERSHIP	
	LOCAL	REGIONAL	NATIONAL	CAN/USA	INTERNATIONAL	PRIVATE	PUBLIC
BYEXPRESS				1		1	
ADCO				1		1	
ADLI	1					1	
AGILITY LOGISTICS INC					1		1
ACCURISTIXS			1			1	
ALL-CONNECT LOGISTICAL SERVICES INC				1		1	
APPROVED CAN TRANSPORT INC		1				1	
BELLVILLE RODAIR INTERNATIONAL				1		1	
BERNHAVEN TRANSPORT SVC	1					1	
BUCKLAND CUSTOMS BROKERS LIMITED				1		1	
CANADIAN FASTFRATE			1			1	
CARRIER ONE				1		1	
CAVALIER TRANSPORT *				1		1	
CEVA LOGISTICS					1	1	
CHALLENGER				1		1	
CITY TRANSFER			1			1	
CONEX FREIGHT	1					1	
CORNWALL WAREHOUSING LTD	1					1	
D A R T Logistics	1					1	
DIRECT SERVICE NETWORK				1		1	
EMBLEM LOGISTICS			1			1	
FARROW LTD				1		1	
FRASER DIRECT DIST. *		1				1	
IMPACT LOGISTICS *				1		1	
KRG LOGISTICS				1		1	
KEELE W/H AND LOGISTICS	1					1	
LAKESIDE LOGISTICS, INC.	1					1	
LASER TRANSPORT LOGISTICS		1				1	
LEGACY SUPPLY CHAIN SERVICES				1		1	
LESLEE INC	1					1	
LOMAS LOGISTICS *				1		1	
MBX LOGISTICS				1		1	
MANITOULIN W/H AND DIST. *			1			1	
MCKENNA LOGISTICS CENTRE			1			1	
METRO LOGISTICS					1	1	
NFI CANADA				1		1	
NATIONAL SHUNT SERVICES				1		1	
NU-ERA	1						1
NU QUEST INTEGRATED			1			1	
OTTAWA LOGISTICS				1		1	
PANALPINA INC					1		1
QUAD LOGISTICS	1					1	
SCI LOGISTICS			1			1	
SGT 2000				1		1	
SCHENKER LOGISTICS					1		1
SHERWAY GROUP	1					1	
TITANIUM LOGISTICS		1					1
TOTALLINE TRANSPORT			1			1	
UNIVERSAL LOGISTICS					1	1	
VISION TRANSPORT SYSTEMS		1				1	
VITRAN / AXIOM WH/CLARK WH				1			1
WILLSON INTERNATIONAL				1		1	
XTL LOGISTICS			1			1	
COLUMN TOTALS	11	5	11	20	6	47	6

THIRD PARTY LOGISTICS	SERVICES OFFERED					
	CLIMATE CONTROL	CROSS DOCK	PICKNPACK	DIST	STORAGE	CO-PACKING
BYEXPRESS	1			1		
ADCO		1	1	1	1	
ADLI	1	1	1	1	1	
AGILITY LOGISTICS INC	1		1	1		
ACCURISTIXS			1			1
ALL-CONNECT LOGISTICAL SERVICES INC	1		1		1	
APPROVED CAN TRANSPORT INC	1	1		1	1	
BELLVILLE RODAIR INTERNATIONAL						
BERNHAVEN TRANSPORT SVC					1	
BUCKLAND CUSTOMS BROKERS LIMITED		1	1	1	1	
CANADIAN FASTFRATE	1	1	1	1	1	
CARRIER ONE						
CAVALIER TRANSPORT *				1		1
CEVA LOGISTICS			1	1	1	1
CHALLENGER	1	1	1	1		
CITY TRANSFER		1		1	1	
CONEX FREIGHT			1		1	
CORNWALL WAREHOUSING LTD	1	1			1	
D A R T Logistics	1				1	
DIRECT SERVICE NETWORK	1			1	1	
EMBLEM LOGISTICS	1	1	1		1	1
FARROW LTD			1			
FRASER DIRECT DIST. *	1		1	1		1
IMPACT LOGISTICS *		1	1		1	
KRG LOGISTICS		1		1		
KEELE W/H AND LOGISTICS		1	1	1	1	
LAKESIDE LOGISTICS, INC.				1	1	
LASER TRANSPORT LOGISTICS	1	1		1	1	
LEGACY SUPPLY CHAIN SERVICES		1	1	1		
LESLEE INC				1	1	
LOMAS LOGISTICS *	1		1		1	1
MBX LOGISTICS	1			1	1	
MANITOULIN W/H AND DIST. *		1	1	1	1	1
MCKENNA LOGISTICS CENTRE		1	1	1	1	
METRO LOGISTICS			1			1
NFI CANADA		1			1	
NATIONAL SHUNT SERVICES		1	1		1	
NU-ERA			1	1	1	
NU QUEST INTEGRATED		1	1		1	
OTTAWA LOGISTICS		1	1	1		
PANALPINA INC		1				
QUAD LOGISTICS		1	1		1	
SCI LOGISTICS			1		1	
SGT 2000					1	
SCHENKER LOGISTICS			1	1	1	
SHERWAY GROUP	1		1	1	1	
TITANIUM LOGISTICS		1	1	1		
TOTALLINE TRANSPORT	1			1	1	
UNIVERSAL LOGISTICS		1			1	
VISION TRANSPORT SYSTEMS		1	1	1		
VITRAN / AXIOM WH/CLARK WH		1	1			
WILLSON INTERNATIONAL					1	
XTL LOGISTICS		1	1		1	
COLUMN TOTALS	17	27	32	29	36	8

THIRD PARTY LOGISTICS	SERVICES OFFERED						SERVICES OFFERED	SIZE WAREHOUSE	EMPLOYEES
	CONSOLIDATION	KITTING	DESTUFF	E-FULLFILMENT	FULLFILMENT	REVERSE LOGISTICS	OTHER	SQ FT	NO.
BYEXPRESS									56
ADCO			1						
ADLI					1	1	1	160,000	40
AGILITY LOGISTICS INC	1						1	200,000	59
ACCURISTIXS	1				1	1		408,000	220
ALL-CONNECT LOGISTICAL SERVICES INC	1						1	50,000	45
APPROVED CAN TRANSPORT INC									10
BELLVILLE RODAIR INTERNATIONAL				1	1	1	1		155
BERNHAVEN TRANSPORT SVC									2
BUCKLAND CUSTOMS BROKERS LIMITED	1						1	130,000	200
CANADIAN FASTFRATE						1	1	1,000,000	1,500
CARRIER ONE									56
CAVALIER TRANSPORT *	1				1			500,000	200
CEVA LOGISTICS		1				1	1		41,000
CHALLENGER			1				1	600,000	2,300
CITY TRANSFER	1								25
CONEX FREIGHT							1	30,000	10
CORNWALL WAREHOUSING LTD							1	800,000	19
D A R T Logistics						1	1		80
DIRECT SERVICE NETWORK							1		23
EMBLEM LOGISTICS							1	377,000	30
FARROW LTD					1		1	265,000	550
FRASER DIRECT DIST. *	1	1				1	1	118,000	130
IMPACT LOGISTICS *	1	1			1		1	65,000	30
KRG LOGISTICS						1			31
KEELE W/H AND LOGISTICS	1	1	1	1	1	1	1	100,000	13
LAKESIDE LOGISTICS, INC.									55
LASER TRANSPORT LOGISTICS								189,000	100
LEGACY SUPPLY CHAIN SERVICES	1	1			1		1	6,000,000	2,700
LESLEE INC								100,000	30
LOMAS LOGISTICS *	1					1	1	705,000	250
MBX LOGISTICS	1							3,000,000	30
MANITOULIN W/H AND DIST. *		1	1						60
MCKENNA LOGISTICS CENTRE				1		1		350,000	50
METRO LOGISTICS	1	1				1	1	10,000,000	2,500
NFI CANADA	1	1			1	1	1	27,500,000	8,000
NATIONAL SHUNT SERVICES					1				425
NU-ERA					1				10
NU QUEST INTEGRATED							1	50,000	16
OTTAWA LOGISTICS					1			250,000	30
PANALPINA INC	1			1			1		15,000
QUAD LOGISTICS					1	1	1		85
SCI LOGISTICS		1			1	1	1	3,000,000	2,000
SGT 2000								36,000	700
SCHENKER LOGISTICS		1			1	1	1	82,800,000	66,000
SHERWAY GROUP							1	1,500,000	250
TITANIUM LOGISTICS	1	1			1	1		60,000	500
TOTALLINE TRANSPORT							1	750,000	130
UNIVERSAL LOGISTICS	1	1			1	1	1		70
VISION TRANSPORT SYSTEMS	1						1	230,000	50
VITRAN / AXIOM WH/CLARK WH		1	1			1	1	1,240,000	125
WILLSON INTERNATIONAL									130
XTL LOGISTICS	1								500
COLUMN TOTALS	19	13	5	4	17	20	31		

WAREHOUSING	SUSTAINABILITY PROGRAM EXISTS		INDUSTRY RECOGNIZED PROGRAM	
	YES	NO	YES	NO
ADK WAREHOUSING		1		1
ASL DISTRIBUTION		1		1
ACCESS W/H		1		1
ACCU-SERVE		1		1
ALL-CAN PRO LOGISTICS		1		1
ARMSTRONG WAREHOUSING	1		1	
ARNONE TRANSPORT LTD		1		1
BLM DIST.	1		1	
BORDERLINE SYSTEMS		1		1
BOWDEN TRANSPORT	1			1
BOYD COMMERCIAL W/H		1		1
BRANTCORD		1		1
BRIMLICH LOGISTICS	1			1
BULLETPROOF		1		1
CN WORLDWIDE CDP	1		1	
CANADA DIST. CENTRE		1		1
COLE INTERNATIONAL		1		1
COMMERCIAL WAREHOUSING LTD	1		1	
CONESTOGA COLD STORAGE		1		1
CONFEDERATED FREEZERS		1		1
DIRECT DISTRIBUTION CR.		1		1
DISTRIBUTOR'S CHOICE		1		1
DOMINION WAREHOUSING		1		1
EASTERN ONTARIO W/H & DIST.		1		1
ERB STORAGE	1		1	
GLOBAL DISTRIBUTION		1		1
GLOBAL SOLUTIONS W/H INC.		1		1
HARBOUR W/H		1		1
HOPEWELL DISTRIBUTION		1		1
HOWELL LOGISTICS		1		1
ICE CORP.	1			1
INSTORAGE DIST.		1		1
INTERFULLFILMENT		1		1
INTERNATIONAL W/H AND DISTR.	1			1
JD SMITH AND SONS	1		1	
JMS W/H		1		1
JP ENTERPRISES		1		1
KATOEN NATIE CANADA	1		1	
KRISKA W/H	1		1	
LAKE ERIE WAREHOUSING		1		1
LYNDEN INTERNATIONAL LTD	1		1	
MACKINNON TRANSPORT	1		1	
MARLAN LOGISTICS		1		1
MIDNIGHT EXPRESS		1		1
MISSISSAUGA W/H		1		1
NATIONAL FOCUS DISTR. INC.		1		1
ONTARIO REFRIGERATION		1		1
PPFD	1			1
POWERHOUSE RETAIL		1		1
PRO DISTRIBUTION		1		1
RDP FULFILLMENT CORP		1		1

WAREHOUSING	PROGRAM TYPE								
	SMARTWAY	LEED	FLEETSMART	ISO 14001	GR. VEH. PR.	BATT. FORKLIFTS	LIGHTING RE	RECYCLING	INDEPENDENT
ADK WAREHOUSING									
ASL DISTRIBUTION									
ACCESS W/H									
ACCU-SERVE									
ALL-CAN PRO LOGISTICS									
ARMSTRONG WAREHOUSING									1
ARNONE TRANSPORT LTD									
BLM DIST.	1								
BORDERLINE SYSTEMS									
BOWDEN TRANSPORT						1	1		
BOYD COMMERCIAL W/H									
BRANTCORD									
BRIMLICH LOGISTICS						1			1
BULLETPROOF									
CN WORLDWIDE CDP							1	1	
CANADA DIST. CENTRE									
COLE INTERNATIONAL									
COMMERCIAL WAREHOUSING LTD	1								
CONESTOGA COLD STORAGE									
CONFEDERATED FREEZERS									
DIRECT DISTRIBUTION CR.									
DISTRIBUTOR'S CHOICE									
DOMINION WAREHOUSING									
EASTERN ONTARIO W/H & DIST.									
ERB STORAGE	1								
GLOBAL DISTRIBUTION									
GLOBAL SOLUTIONS W/H INC.									
HARBOUR W/H									
HOPEWELL DISTRIBUTION									
HOWELL LOGISTICS									
ICE CORP.							1	1	1
INSTORAGE DIST.									
INTERFULLFILMENT									
INTERNATIONAL W/H AND DISTR.						1			
JD SMITH AND SONS	1						1		1
JMS W/H									
JP ENTERPRISES									
KATOEN NATIE CANADA						1	1	1	1
KRISKA W/H	1					1		1	
LAKE ERIE WAREHOUSING									
LYNDEN INTERNATIONAL LTD	1								1
MACKINNON TRANSPORT	1								
MARLAN LOGISTICS									
MIDNIGHT EXPRESS									
MISSISSAUGA W/H									
NATIONAL FOCUS DISTR. INC.									
ONTARIO REFRIGERATION									
PPFD							1		1
POWERHOUSE RETAIL									
PRO DISTRIBUTION									
RDP FULFILLMENT CORP									

WAREHOUSING	TRADE AREA					OWNERSHIP	
	LOCAL	REGIONAL	NATIONAL	CAN/USA	INTERNATIONAL	PRIVATE	PUBLIC
ADK WAREHOUSING	1					1	
ASL DISTRIBUTION					1	1	
ACCESS W/H				1		1	
ACCU-SERVE	1					1	
ALL-CAN PRO LOGISTICS		1				1	
ARMSTRONG WAREHOUSING					1	1	
ARNONE TRANSPORT LTD	1					1	
BLM DIST.					1	1	
BORDERLINE SYSTEMS	1					1	
BOWDEN TRANSPORT	1					1	
BOYD COMMERCIAL W/H	1					1	
BRANTCORD	1					1	
BRIMLICH LOGISTICS	1					1	
BULLETPROOF					1	1	
CN WORLDWIDE CDP						1	1
CANADA DIST. CENTRE				1		1	
COLE INTERNATIONAL					1	1	
COMMERCIAL WAREHOUSING LTD	1					1	
CONESTOGA COLD STORAGE				1		1	
CONFEDERATED FREEZERS		1				1	
DIRECT DISTRIBUTION CR.				1		1	
DISTRIBUTOR'S CHOICE	1					1	
DOMINION WAREHOUSING				1		1	
EASTERN ONTARIO W/H & DIST.				1		1	
ERB STORAGE					1	1	
GLOBAL DISTRIBUTION	1					1	
GLOBAL SOLUTIONS W/H INC.	1					1	
HARBOUR W/H	1					1	
HOPEWELL DISTRIBUTION				1		1	
HOWELL LOGISTICS	1					1	
ICE CORP.				1		1	
INSTORAGE DIST.	1					1	
INTERFULLFILMENT	1					1	
INTERNATIONAL W/H AND DISTR.	1					1	
JD SMITH AND SONS					1	1	
JMS W/H	1					1	
JP ENTERPRISES					1	1	
KATOEN NATIE CANADA					1	1	
KRISKA W/H		1				1	
LAKE ERIE WAREHOUSING					1	1	
LYNDEN INTERNATIONAL LTD					1	1	
MACKINNON TRANSPORT				1		1	
MARLAN LOGISTICS				1		1	
MIDNIGHT EXPRESS	1					1	
MISSISSAUGA W/H	1					1	
NATIONAL FOCUS DISTR. INC.	1					1	
ONTARIO REFRIGERATION	1					1	
PPFD	1					1	
POWERHOUSE RETAIL	1					1	
PRO DISTRIBUTION	1					1	
RDP FULFILLMENT CORP	1					1	

WAREHOUSING	TRADE AREA					OWNERSHIP		
	LOCAL	REGIONAL	NATIONAL	CAN/USA	INTERNATIONAL	PRIVATE	PUBLIC	
ADK WAREHOUSING	1					1		
ASL DISTRIBUTION					1	1		
ACCESS W/H				1		1		
ACCU-SERVE	1					1		
ALL-CAN PRO LOGISTICS		1				1		
ARMSTRONG WAREHOUSING					1	1		
ARNONE TRANSPORT LTD	1					1		
BLM DIST.					1	1		
BORDERLINE SYSTEMS	1					1		
BOWDEN TRANSPORT	1					1		
BOYD COMMERCIAL W/H	1					1		
BRANTCORD	1					1		
BRIMLICH LOGISTICS	1					1		
BULLETPROOF					1	1		
CN WORLDWIDE CDP							1	1
CANADA DIST. CENTRE				1		1		
COLE INTERNATIONAL					1	1		
COMMERCIAL WAREHOUSING LTD	1					1		
CONESTOGA COLD STORAGE				1		1		
CONFEDERATED FREEZERS		1				1		
DIRECT DISTRIBUTION CR.				1		1		
DISTRIBUTOR'S CHOICE	1					1		
DOMINION WAREHOUSING				1		1		
EASTERN ONTARIO W/H & DIST.				1		1		
ERB STORAGE					1	1		
GLOBAL DISTRIBUTION	1					1		
GLOBAL SOLUTIONS W/H INC.	1					1		
HARBOUR W/H	1					1		
HOPEWELL DISTRIBUTION				1		1		
HOWELL LOGISTICS	1					1		
ICE CORP.				1		1		
INSTORAGE DIST.	1					1		
INTERFULLFILMENT	1					1		
INTERNATIONAL W/H AND DISTR.	1					1		
JD SMITH AND SONS					1	1		
JMS W/H	1					1		
JP ENTERPRISES					1	1		
KATOEN NATIE CANADA					1	1		
KRISKA W/H		1				1		
LAKE ERIE WAREHOUSING					1	1		
LYNDEN INTERNATIONAL LTD					1	1		
MACKINNON TRANSPORT			1			1		
MARLAN LOGISTICS			1			1		
MIDNIGHT EXPRESS	1					1		
MISSISSAUGA W/H	1					1		
NATIONAL FOCUS DISTR. INC.	1					1		
ONTARIO REFRIGERATION	1					1		
PPFD	1					1		
POWERHOUSE RETAIL	1					1		
PRO DISTRIBUTION	1					1		
RDP FULFILLMENT CORP	1					1		

WAREHOUSING	SERVICES OFFERED						
	CLIMATE CONTROL	CROSS DOCK	PICKNPACK	DIST	STORAGE	CO-PACKING	CONSOLIDATION
ADK WAREHOUSING	1	1	1		1		
ASL DISTRIBUTION		1	1				1
ACCESS W/H							
ACCU-SERVE	1		1				
ALL-CAN PRO LOGISTICS	1		1		1		1
ARMSTRONG WAREHOUSING		1	1		1		
ARNONE TRANSPORT LTD		1			1		
BLM DIST.		1			1		
BORDERLINE SYSTEMS			1	1			
BOWDEN TRANSPORT			1		1		
BOYD COMMERCIAL W/H		1	1				
BRANTCORD			1				1
BRIMLICH LOGISTICS	1	1		1	1		1
BULLETPROOF		1	1	1			1
CN WORLDWIDE CDP				1			1
CANADA DIST. CENTRE		1	1		1		1
COLE INTERNATIONAL		1	1		1		1
COMMERCIAL WAREHOUSING LTD			1		1		
CONESTOGA COLD STORAGE	1						
CONFEDERATED FREEZERS	1						
DIRECT DISTRIBUTION CR.			1		1		
DISTRIBUTOR'S CHOICE			1				
DOMINION WAREHOUSING					1		
EASTERN ONTARIO W/H & DIST.		1					1
ERB STORAGE	1						
GLOBAL DISTRIBUTION			1		1		
GLOBAL SOLUTIONS W/H INC.			1	1			
HARBOUR W/H		1	1				1
HOPEWELL DISTRIBUTION	1				1		
HOWELL LOGISTICS			1	1			
ICE CORP.	1	1			1		
INSTORAGE DIST.		1	1	1	1		1
INTERFULLFILMENT		1	1				
INTERNATIONAL W/H AND DISTR.							1
JD SMITH AND SONS			1				
JMS W/H		1	1	1			
JP ENTERPRISES		1	1				
KATOEN NATIE CANADA	1				1		
KRISKA W/H		1	1		1		
LAKE ERIE WAREHOUSING			1	1			1
LYNDEN INTERNATIONAL LTD	1		1				1
MACKINNON TRANSPORT			1				1
MARLAN LOGISTICS		1	1				1
MIDNIGHT EXPRESS		1	1	1			1
MISSISSAUGA W/H					1		
NATIONAL FOCUS DISTR. INC.				1			
ONTARIO REFRIGERATION	1	1	1				
PPFD	1		1	1	1		
POWERHOUSE RETAIL			1		1		
PRO DISTRIBUTION		1	1	1			1
RDP FULFILLMENT CORP			1	1			1

WAREHOUSING	SERVICES OFFERED						SIZE WAREHOUSE	EMPLOYEES
	KITTING	DESTUFF	E-FULLFILMENT	FULLFILMENT	REVERSE LOGISTICS	OTHER	SQ FT	NO.
ADK WAREHOUSING						1	120000	10
ASL DISTRIBUTION	1				1	1	300000	175
ACCESS W/H				1		1	979000	8
ACCU-SERVE				1		1	80000	5
ALL-CAN PRO LOGISTICS							271000	29
ARMSTRONG WAREHOUSING	1	1					100000	
ARNONE TRANSPORT LTD						1	75000	75
BLM DIST.							200000	678
BORDERLINE SYSTEMS	1			1	1	1	46000	18
BOWDEN TRANSPORT							60000	20
BOYD COMMERCIAL W/H	1						195000	28
BRANTCORD							250000	8
BRIMLICH LOGISTICS							150000	40
BULLETPROOF		1					300000	16
CN WORLDWIDE CDP							1300000	200
CANADA DIST. CENTRE							40000	10
COLE INTERNATIONAL	1			1		1	100000	17
COMMERCIAL WAREHOUSING LTD						1	350000	45
CONESTOGA COLD STORAGE							110365	20
CONFEDERATED FREEZERS							390000	140
DIRECT DISTRIBUTION CR.			1		1	1	1200000	3000
DISTRIBUTOR'S CHOICE	1			1			50000	12
DOMINION WAREHOUSING	1						1500000	150
EASTERN ONTARIO W/H & DIST.	1				1		300000	
ERB STORAGE							88000	1300
GLOBAL DISTRIBUTION							500000	35
GLOBAL SOLUTIONS W/H INC.	1			1		1	100000	1
HARBOUR W/H							190000	9
HOPEWELL DISTRIBUTION							2300000	240
HOWELL LOGISTICS	1	1					1100000	150
ICE CORP.	1	1	1				300000	80
INSTORAGE DIST.						1	30000	7
INTERFULLFILMENT	1			1			21000	10
INTERNATIONAL W/H AND DISTR.							45000	
JD SMITH AND SONS				1		1	600000	225
JMS W/H	1					1	400000	10
JP ENTERPRISES				1			111612	70
KATOEN NATIE CANADA							4800000	8000
KRISKA W/H						1	300000	120
LAKE ERIE WAREHOUSING	1	1		1		1	187000	9
LYNDEN INTERNATIONAL LTD						1	71000	150
MACKINNON TRANSPORT							80000	350
MARLAN LOGISTICS		1					80000	15
MIDNIGHT EXPRESS							30000	100
MISSISSAUGA W/H							100000	8
NATIONAL FOCUS DISTR. INC.							200000	34
ONTARIO REFRIGERATION							400000	7
PPFD							150000	80
POWERHOUSE RETAIL							90000	50
PRO DISTRIBUTION							75000	20
RDP FULFILLMENT CORP	1						150000	50

	SUSTAINABILITY PROGRAM EXISTS		INDUSTRY RECOGNIZED PROGRAM	
	YES	NO	YES	NO
SHANDEX SALES	1		1	
SIMARD	1		1	
SIMTECH S/C MANAGEMENT LTD		1		1
STALCO INC		1		1
TLS	1			1
THOMSON TERMINALS	1		1	
TILWOOD INC		1		1
TRENTON COLD STORAGE	1		1	
TRIGISTIX W/H & DIST.		1		1
TRIPLE B W/H		1		1
U-CAM UNIVERSAL/KITT W/H		1		1
VERSA COLD GROUP	1			1
VOYAGEUR DIST.		1		1
WILLS TRANSFER LTD		1		1
WOLVERINE W/H	1			1
YORK W/H & DIST		1		1
COLUMN TOTALS	22	45	14	53

	PROGRAM TYPE									
	SMARTWAY	LEED	FLEETSMART	ISO 14001	GR. VEH. PR.	BATT. FORKLIFTS	LIGHTING RE	RECYCLING	INDEPENDENT	
SHANDEX SALES			1							
SIMARD	1									
SIMTECH S/C MANAGEMENT LTD										
STALCO INC										
TLS						1				
THOMSON TERMINALS	1		1				1	1	1	
TILWOOD INC										
TRENTON COLD STORAGE						1	1	1	1	
TRIGISTIX W/H & DIST.										
TRIPLE B W/H										
U-CAM UNIVERSAL/KITT W/H										
VERSA COLD GROUP						1	1	1	1	
VOYAGEUR DIST.										
WILLS TRANSFER LTD										
WOLVERINE W/H										
YORK W/H & DIST										
COLUMN TOTALS	9	0	2	0	0	8	9	7	10	

	TRADE AREA					OWNERSHIP	
	LOCAL	REGIONAL	NATIONAL	CAN/USA	INTERNATIONAL	PRIVATE	PUBLIC
SHANDEX SALES		1				1	
SIMARD				1		1	
SIMTECH S/C MANAGEMENT LTD		1				1	
STALCO INC	1					1	
TLS	1					1	
THOMSON TERMINALS				1		1	
TILWOOD INC	1					1	
TRENTON COLD STORAGE				1		1	
TRIGISTIX W/H & DIST.	1					1	
TRIPLE B W/H	1					1	
U-CAM UNIVERSAL/KITT W/H	1					1	
VERSA COLD GROUP				1		1	
VOYAGEUR DIST.	1					1	
WILLS TRANSFER LTD		1				1	
WOLVERINE W/H		1				1	
YORK W/H & DIST	1					1	
COLUMN TOTALS	34	7	14	9	3	66	1

	SERVICES OFFERED						
	CLIMATE CONTROL	CROSS DOCK	PICKNPACK	DIST	STORAGE	CO-PACKING	CONSOLIDATION
SHANDEX SALES	1	1	1				
SIMARD			1	1			1
SIMTECH S/C MANAGEMENT LTD	1	1	1				1
STALCO INC	1		1		1		
TLS		1	1		1		
THOMSON TERMINALS	1		1	1			1
TILWOOD INC			1	1	1		
TRENTON COLD STORAGE	1						
TRIGISTIX W/H & DIST.		1	1	1	1		1
TRIPLE B W/H			1				
U-CAM UNIVERSAL/KITT W/H		1	1	1	1		1
VERSA COLD GROUP	1						
VOYAGEUR DIST.		1	1	1			1
WILLS TRANSFER LTD	1	1	1	1			1
WOLVERINE W/H			1				
YORK W/H & DIST	1		1	1	1		1
COLUMN TOTALS	21	29	49	22	27	0	27

	SERVICES OFFERED						SIZE WAREHOUSE	EMPLOYEES
	KITTING	DESTUFF	E-FULLFILMENT	FULLFILMENT	REVERSE LOGISTICS	OTHER	SQ FT	NO.
SHANDEX SALES	1						300000	100
SIMARD					1	1	1500000	1455
SIMTECH S/C MANAGEMENT LTD		1				1	350000	55
STALCO INC				1			150000	20
TLS						1	377000	15
THOMSON TERMINALS							2700000	500
TILWOOD INC					1		100000	50
TRENTON COLD STORAGE							93000	250
TRIGISTIX W/H & DIST.							100000	8
TRIPLE B W/H							150000	5
U-CAM UNIVERSAL/KITT W/H		1					403000	25
VERSA COLD GROUP							10000	350
VOYAGEUR DIST.	1					1	7500	4
WILLS TRANSFER LTD							500000	120
WOLVERINE W/H	1					1	65000	
YORK W/H & DIST							400000	16
COLUMN TOTALS	18	8	2	10	11	17		

Appendix E- Web Sites Used to Collect Raw Data

http://www.byexpress.com/company.html

http://www.adco-logistics.com/OtherDetails/Milkruns

http://adlilogistics.com/warehousing/

http://www.agility.com/EN/about-us/Pages/About-Agility-3PL.aspx

http://www.agility.com/EN/csr/Pages/default.aspx

 ttp://www.agility.com/EN/csr/pages/environment.aspx

http://www.accuristix.com/en/services/overview.html

http://www.accuristix.com/en/facilities/facilities.html

http://www.allconnect.ca/aboutus.aspx

http://www.rodair.com/en/services/logistics-distribution

http://www.manta.com/ic/mt634c7/ca/rodair-international-ltd

http://www.buckland.com/services/warehousing-distribution/

http://www.buckland.com/about/

http://www.fastfrate.com/en/about-fastfrate-green-trucking.aspx

http://www.fastfrate.com/en/core-services-third-party-logistics.aspx

http://www.nfiindustries.com/services/distribution/warehousing/

http://www.nfiindustries.com/services/distribution/value-added-services/

http://www.nfiindustries.com/about-nfi/awards/

http://www.cavalier.ca/en/services_warehousing_distribution.asp

http://www.cavalier.ca/en/about_cavalier_transportation_services_environment.asp

http://cdn.cevalogistics.com/sites/default/files/Sustainability_report_2014_3.pdf

http://www.cevalogistics.com/contract-logistics

https://www.challenger.com/logistics-warehousing/warehousing/

http://www.citytransfer.net/en-ca/warehousing.html

http://conexfreightforwarding.com/

http://www.manta.com/ic/mt67flw/ca/conex-freight-forwarding-inc

http://www.cornwallwarehousing.com/ware.html

http://www.ic.gc.ca/app/ccc/srch/nvgt.do;jsessionid=000197PhXU1jK-wJe-yh7miiZO1:3PPLVSUJOA?lang=eng&prtl=1&sbPrtl=&estblmntNo=123456261753&profile=cmpltPrfl&profileId=1921&app=sold&searchNav=F

http://www.chemicaltransportation.com/about-dsn/green-transportation/

http://www.thomaslargesinger.com/warehousing-service-canada.

http://www.thomaslargesinger.com/logistics-company-canada

http://www.farrow.com/services-farrow-logistics

http://www.fraserdirect.ca/

http://www.impactlogistics.com/aboutus.aspx

http://krglogistics.com/service-portfolio/warehousing-distribution/

https://www.linkedin.com/company/krg-logistics-inc

http://www.manta.com/ic/mt6glnt/ca/krg-logistics-inc

http://www.keelewarehousing.com/warehousing-toronto-canada

http://www.ic.gc.ca/app/ccc/srch/nvgt.do;jsessionid=000189iLLD2b83dovK6IkdE0OdJ:-AE3TF8?lang=eng&prtl=1&sbPrtl=&estblmntNo=234567132255&profile=cmpltPrfl&profileId=1921&app=sold&searchNav=F

http://www.lakesidebesmart.com/about/vision_green

http://www.lakesidebesmart.com/about/vision_green/report

http://www.lasertrans.com/warehousing

http://www.lasertrans.com/distribution

http://www.lasertrans.com/index

https://legacyscs.com/locations/

https://legacyscs.com/services/warehousing/dedicated/

https://legacyscs.com/3pl-company/

http://www.leslee.com/company.html

https://legacyscs.com/3pl-company/sustainability/

https://legacyscs.com/sustainability-part-1-going-green-supply-chain/#

http://www.lomaslogistics.com/locations.jsp

http://www.ic.gc.ca/app/ccc/srch/nvgt.do?prtl=1&estblmntNo=234567066596&profile=cmpltPrfl&profileId=501&app=sold&lang=eng

http://www.mbxlogistics.com/services-capabilities.asp#warehouse

http://www.mbxlogistics.com/history.asp

http://www.manitoulingroup.com/index.php/en/about-us/corporate-responsibility.html

http://www.manitoulingroup.com/index.php/en/services/warehousing.html

http://www.mckennalogistics.ca/our-facilities

http://www.metroscg.com/english/getPage.php?menuID=7

http://www.metroscg.com/english/pdf/Lighting%20the%20Way.pdf

http://www.metroscg.com/english/getPage.php?menuID=1

http://www.ttgi.com/_forms/ttr_Presentation.pdf

http://www.nfiindustries.com/services/distribution/warehousing/

http://www.nfiindustries.com/services/distribution/value-added-services/

http://www.nationalshunt.com/en/environment/

http://www.nationalshunt.com/en/locations/

http://www.nationalshunt.com/en/solutions/logistics-management/warehousing-fulfillment/

https://www.linkedin.com/company/nu-era-logistics-inc-

http://www.nuquestfreight.com/contact-us-

http://www.nuquestfreight.com/services/warehouse-and-distribution

http://www.manta.com/ic/mt6m0k8/ca/nuquest-integrated-services-inc

http://www.ottawalogistics.com/warehousing-facilities/

http://www.panalpina.com/www/global/en/footer/copyright.html

http://www.panalpina.com/www/global/en/home/AboutPanalpina.html

http://www.panalpina.com/content/www/global/en/home/AboutPanalpina/sustainable-action/_jcr_content/contentParSys/download/downloadList/_2013_corporate_sust.spooler.download/Panalpina%20Corporate%20Social%20Responsibility%20Report%202015.pdf

http://www.panalpina.com/www/global/en/home/AboutPanalpina/Key_Facts.html

http://www.quadlogistix.com/index.php/en/company/what-we-do

http://www.quadlogistix.com/index.php/en/company/de-trash-and-recycle

http://www.quadlogistix.com/index.php/en/services

http://www.scilogistics.com/en/

http://www.scilogistics.com/en/about_sci_logistics.shtml

http://www.scilogistics.com/en/warehousing.shtml

http://www.scilogistics.com/en/retail/retail.shtml

http://www.sgt2000.com/services/LSentreposage.aspx

http://www.sgt2000.com/Coordonnees/contacts.aspx

https://www.jobillico.com/see-company/sgt-2000-inc

http://www.dbschenker.ca/log-ca-en/About_DB_Schenker/Profile.html

http://www.dbschenker.ca/log-ca-en/Sustainability/Environment/overview.html

http://www.dbschenker.ca/file/log-ca-en/6435412/dmfXLrfYfs8jgzFnlh41ZmCN-c4/7808420/data/Canada_ISO_cert.pdf

http://www.dbschenker.ca/log-ca-en/Products_and_Services/contract_logistics_scm/db_schenker_advantage.html

http://www.dbschenker.com/ho-en/products_services/contract_logistics/advantage.html

http://www.dbschenker.com/ho-en/products_services/contract_logistics/core_products/fulfillement_logistics.html

http://www.sherwaygroup.com/OurServices/Logistics

http://www.sherwaygroup.com/OurServices/Warehousing

http://www.sherwaygroup.com/About/CompanyProfile

http://www.totalline.com/services/warehousing.asp?m2=btn_tlt&m1=btn_services

http://www.totalline.com/about/corporate.asp?m2=btn_corporate&m1=btn_aboutus

http://www.totalline.com/contact_us.asp

http://www.universallogistics.ca/p/en/whyus-about-company-locations-universal.php

http://www.universallogistics.ca/p/en/distribution-intro-warehousing-storage-services.php

http://www.ic.gc.ca/app/ccc/srch/nvgt.do;jsessionid=0001W_xeXQ3880vLnaJ1EOfXaqQ:-AE3TF8?lang=eng&prtl=1&sbPrtl=&estblmntNo=123456024188&profile=cmpltPrfl&profileId=1921&app=sold&searchNav=F

http://www.visiontrans.com/content.aspx?title=Specialty%20Services&category=Services

http://www.visiontrans.com/content.aspx?title=Sustainability%20Initiatives&category=About%20Us

http://www.visiontrans.com/content.aspx?title=About%20Us&category=About%20Us

http://www.transforcecompany.com/en/home/

http://www.transforcecompany.com/en/about/sustainability/

http://www.transforcecompany.com/en/operations/logistics/

http://www.quikx.com/quikxgrpweb/en/about_quikx_green_initiatives.html

http://www.clarkelink.com/clarke_warehousing.aspx

http://www.clarkelink.com/envprotectionpolicy.aspx

http://www.willsonintl.com/our-community/

http://www.willsonintl.com/our-locations/

http://www.xtl.com/corporate/physical-locations/

http://www.xtl.com/logistics/logistics-architecture/

https://www.linkedin.com/company/xtl-transport-inc-

http://www.xtl.com/wp-content/uploads/2013/06/swcs-xtl-final-eng.pdf

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