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Purdue University West Lafayette, Indiana



College Technology

Sustainable purchasing practices: An investigation into current industry awareness and practice.

In partial fulfillment of the requirements for the Degree of Master of Science in Technology

A Directed Project Report

By

Francis Xavier Palisi

April 2012

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DEDICATION

To Frank and Kristy Palisi,

Thank you for all your support over the years, not only financially but your extensive personal support. I would not be where I am today without your guidance and unwavering confidence. You have done an amazing job for all of your kids to show them how to succeed in life and to never quit their dreams.

To Brian O'Neill, Michael Frisella, Michael Yoesep, and Dustin Veternik,

Thank you for the late night support through those challenging hours and always remaining positive for me. You always had unwavering faith that I would also land on my feet and finish anything I started. Without the firm foundation of friendship and guidance that you have given me through my graduate studies, these past two years would have been overbearingly difficult.

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I would like to single out a couple individuals who have been there for me to bounce ideas off of and have helped me develop my research topic. Dr. Kathryne Newton who has been a crucial part of my brainstorming sessions to find a worthwhile topic and has always given solutions to the many obstacles I have faced. Dr. Edward Sweeney for all the work he has done in editing and fine tuning my research. He has helped me tremendously through my overseas graduate studies. Dr. Gareth O'Donnell for all of the quick email responses and reassuring guidance through my last year in the Atlantis program. He played a critical role in supporting the students in Europe and will never understand how much help he was to us. I would like to thank all of you deeply for your help over these past two years.

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LIST OF ABBREVIATIONS

- ASA American Supply Association
- CSR Corporate Social Responsibility
- CWRT Center for Waste Reduction Technologies
- EMS Environmental Management Systems
- GEMI Global Environmental Management Initiative
- GRI Global Reporting Initiative
- ISO International Standards Organization
- NAICS North American Industry Classification System
- NGO Nongovernment Organization
- SCM Supply Chain Management
- SC Supply Chain
- SPP Sustainable Purchasing Practices
- SSCM Sustainable Supply Chain Management
- TCO Total Cost of Ownership
- PHCP -Plumbing, Heating, Cooling and Piping
- PSR Purchasing Social Responsibility
- LCA Life Cycle Analysis
- SME Small and Medium Enterprises
- WMOB Women and Minority-Owned Businesses
- WBCSD World Business Council for Sustainable Development

ABSTRACT

Palisi, Francis Xavier. M.S. Industrial Technology, Purdue University, May 2012. M.S. Sustainability, Technology, and Innovation, Dublin Institute of Technology. June 2012. Sustainable purchasing practices: An investigation into current industry awareness and practice. Major Professors: Dr. Kathryne Newton and Dr. Edward Sweeney.

This research study illustrates the growing importance of sustainable purchasing practices and answers two important questions: what is the current awareness of U.S. organizations on sustainable purchasing practices with regards to evaluating, selecting, and retaining suppliers and to what extent are these practices being implemented? The research conducted is based upon an in-depth literature review of green purchasing and sustainability initiatives. With an ever increasing global economy with no intention of slowing down it is ever important to look towards sustainability practices and the biggest impact organizations can make is in the purchasing department. The researcher begins by explaining their reasoning for conducting the research, then builds the readers understanding of sustainability and supply chain management, so as to dive further into the subject of how sustainable purchasing can be the most advantageous method to bringing about triple bottom savings to an organization. This section is followed by the researcher's methodology and ending results that show the current awareness and implementation of U.S. plumbing, heating, cooling and piping (PHCP) manufacturing and distribution firms who participate in sustainable purchasing practices (SPP).

This study used a structured web-based survey created from pertinent literature emailed to the American Supply Association (ASA) population. ASA is a not-for-profit national organization serving wholesale distributors and their suppliers. The growing need for training in industry on sustainability issues is critical if organizations want to remain competitive in this current global economy. This study gives insights to the current practice of sustainable purchasing and current awareness of SPP being implemented in the United States.

SECTION 1. INTRODUCTION

This section contains the research question being pursued and the reasoning for conducting this research. Definitions are provided to aid individuals who may be unfamiliar with sustainability or supply chain terminology. The researcher's assumptions are also presented along with the limitations and delimitations of this study.

1.1.Research Questions

This research is directed towards the purchasing professional in the United States plumbing, heating, cooling, and piping (PHCP) manufacturing and distribution industry. The questions answered in this study have been developed through an extensive literature review. The questions are: What is the current awareness of U.S. firms on sustainable purchasing with regards to evaluating, selecting, and retaining suppliers? To what extent are these practices implemented?

1.2. Statement of Problem

As organizations become more and more global and begin to interact with different governments and communities around the world they increase their chances of supply disruptions and damage to their brand image. Organizations should train their employees on sustainable purchasing methods to ensure they are protecting their organizations from external threats and mitigate the risk of supply disruptions. Countless organizations have made the mistake of purchasing materials or products from unethical suppliers and have

had to live with the consequences. These consequences come in many forms but all affect the organization's triple bottom line. To protect an organization from financial fines and loses in market share an organization must know what is going into the production of their product and how the people involved in the manufacturing and distribution of the product are treated. The need for organizations to train their buyers on SPP is essential to reduce waste and costs.

The research conducted allows for an overview of to what extent industry is implementing SPP and the basic awareness of sustainability. This research allows for further research to be conducted on the topic of SPP. Sustainability contains not only being eco-friendly by reducing carbon emissions of manufactured products.

Sustainability also considers the price of the product and the treatment of the local community in which an organization resides, to site a few examples, this is discussed in further detail later in this section.

It is important for organizations to learn from one another in their industry. The benchmark created in this research will help society move towards the sustainability horizon. It is a society's responsibility to always check and recheck its policies and practices against the competition to ensure the best practices are in place.

1.3. Significance of Problem

This research adds to the body of knowledge presently being created on how to measure one's organization against a competitor when it comes to publicly acknowledging their efforts towards sustainability. Organizations are able to replicate the methods in this research to conduct an internal audit of whether their organization can benefit from employee training on SPP or exceeding what their competition is currently

practicing. The importance of this research is for an organization to self-audit their employee's behavior and knowledge on the topic of SPP.

1.4. Statement of Purpose

The growing concern for company-wide security and profits has led to the development of such programs as lean manufacturing, Six Sigma, and Total Quality Management to name a few. Sustainability practices are what organizations are beginning to turn to, to better protect themselves against the unpredictable. The research conducted measured the current awareness and implementation of sustainability in an organization's purchasing department. The researcher has relied on the aid of American Supply Association (ASA) for contact information of their constituents. Through the use of a web-based survey the researcher has gained a deeper understanding of the current standards organizations required of their suppliers. The research was compared with other responses from individuals in the industry for benchmarking purposes. The survey used in this research incorporates a survey from Dr. Craig R. Carter and Dr. Marianne Jennings study to gain validity (Carter & Jennings, 2002).

This study represents an informal benchmark for conducting an internal audit of an organization's purchasing department to assess the level of sustainable awareness and their current implementation. The study also allows industry to see the current trend of SPP implementation, along with suggestions for further research on this topic area.

1.5.Definitions

Buyer – the essential activities associated with the acquisition of materials, services, and equipment used in the operation of an organization (Dobler & Burt, 1996, p35).

Green purchasing - an environmentally conscious purchasing practice which aims to ensure the items purchased meets the environmental objectives of an organization (Carter & Ellram, 1998; Min & Galle, 2001; Zsidisin & Siferd, 2001).

Social desirability bias - occurs in survey research when respondents inaccurately answer questions to conform to social norms or the expectations of the researcher, in order to portray themselves in a more favorable light (Carter & Jennings, 2004).

Supply chain - all activities associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated information flows. Materials and information flow both up and down the supply chain (Handfield & Nichols, 1999).

Sustainability - development that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commission on Environmental and Development, 1987).

Triple bottom line - the relationship between economic, social, and environmental responsibilities (Elkington, 1998).

1.6. Assumptions

The assumptions for this research included:

- The American Supply Association provided their member's contact information to the researcher.
- All of the information provided to the researcher is truthful and to the best knowledge of the respondent giving the information.

- The respondents were not forced to part take in the survey by any party.
- The data collected answers the initial questions.
- The respondents surveyed are purchasing professionals in the United States.

1.7. Delimitations

The delimitations for this research included:

- This research was exploratory in nature and does not give any definitive answers.
- This research only contains organizations in the private sector and does not include nongovernment organizations (NGO) or government organizations.
- This research collected only demographic data on the buying organization and not their suppliers.
- This research did not judge the merit of different purchasing practices.
- The respondents were from the retail and wholesale trade industries which have different factors and regulations into why or why not an organization incorporates
 SPP. This research did not take into account those factors.
- This research was focused solely on the impact a buyer can make on an organization's sustainability.

1.8.Limitations

The limitations for this research included:

 The majority of respondents who received the survey did not return it completed or at all.

- The data collected was descriptive, which allowed for only observational data to be collected. The conclusions made in this study are only on the observed population.
- Due to the use of ASA members, this research pulled from leaders in their field and did not capture the average buyer and their practices.
- This research did not use simple random sampling due to limited number of respondents and low return rate of online survey. Therefore data is not truly accurate of a larger population.
- This research is not generalizable to the purchasing professional population in the United States.
- The survey used in this study was not all inclusive of the different purchasing practices in the industry.
- This research did not go into detail about available governmental or organizational policies in regards to sustainability practices.
- The survey used closed answer questions which prohibit deeper analysis on the reasoning of respondents' answers.
- Due to keeping the respondent's anonymity it is not possible to identify if all or the majority of responses come from one organization.

1.9. Section Summary

The importance of this research is to add to the body of knowledge on awareness of SPP currently utilized throughout the United States. There is a growing concern that organizations could be doing more if they had the awareness on how SPP initiatives

could impact them financially. This research study is limited in its examination of United States purchasing practices, but should serve as a starting point for further research and new theories in this field.

SECTION 2. LITERATURE REVIEW

2.1.Introduction

This section defends the importance of the study and shows the gap of knowledge through pertinent literature. This section also contains the researcher's reasoning for the chosen design of the survey and its dissemination amongst the chosen population. An extensive literature review was conducted over a one year period using sources from peer reviewed journals, books, course work, and personal conversations to develop the questions and reasoning for this study. This section begins by defining sustainability and supply chain management (SCM). Then the two definitions merge into what is known as sustainable supply chain management (SSCM). This is done to build a simple foundation of knowledge for the reader so the researcher can dive further into the topic of supply chain management without losing the reader in the copious amounts of SCM jargon. The section then moves from discussing the entire supply chain down to a single key player, the buyer. The researcher shows how a buyer who is well trained on the topic of SPP can impact an organization's triple bottom line and will be able to navigate through the different pit falls of implementing SPP into their organization. The sections thereafter show the different tools a buyer uses to bring about sustainable change throughout the supply chain starting with the different partnerships and then how to implement change with the use of those partnerships and the different key players that are needed for a partnership to work. Then the difficulty of implementing change and

partnerships with domestic suppliers along with the increasing difficulty of foreign partnership is discussed. As a buyer creates these partnerships with both foreign and domestic suppliers the buyer must also benchmark and monitor their suppliers as well as themselves to increase transparency and cost reduction. This leads to the section on stakeholder's influence which is a key tool for the buyer to enforce and monitor participants in the supply chain. The layout of the following sections simply start from a large scope of the supply chain and by the end drills down to all the tools a buyer has at their disposal to bring about sustainable change. This is done to keep the reader engaged and to not lose the reader along the way.

2.2.Literature Review

Since 1950 the world's population has more than doubled, energy production has tripled, and economic output has increased by a factor of five (Ruttan, 2001). Products in developed countries are continuously being produced without care for the manufacturing and product inefficiencies and have created more pollution than is necessary. This is all done to meet an over consuming societal demand. Countries and organizations must turn towards the concepts of sustainability or will see their natural resources disappear (Woodhouse, 2001). Elkington's (1998) paper, *Partnerships from Cannibals with Forks*, provided the results of a study on European graduates. The study showed more students being educated on the theory of sustainability in universities across 14 countries. Students are being taught to weigh both the environmental and financial impacts equally when making business decisions.

This study helps illustrate the growing importance of sustainability in today's global economy and how organizations integrating those concepts into their purchasing

practices can make the largest impact. The research shown here focuses on the procurement function of the supply chain and the various forces a buyer has to implement sustainable purchasing practices (SPP). The research helps illustrate the relationship between awareness of SPP and their implementation within an organization's strategic sourcing initiatives. The study showed with more training given to employees there is a higher rate of the successful implementation and use of green purchasing initiatives. A related study performed by Murphy et al. (1996) showed when an organization invests in environmental training of their employees the organization was more environmentally progressive compared to an organization that invested less. Unlike the study in which Murphy et al. conducted, this study only focuses on the procurement function of the supply chain as well as not surveying only logistic firms but will canvas the PCHP manufacturing and distribution firms that return the web-based survey. The reason for focusing on the purchasing department of an organization is because the purchasing of goods is where the supply chain begins. The role of the buyer is the ideal spot for an organization to implement waste reduction (Porter & Van der Linde, 1995; Carter, Ellram, & Ready, 1998). Buyers are an organization's first point of contact with an organization's suppliers and used correctly can create partnerships and even change the way a product is manufactured. The supply chain itself is built on relationships between the supplier and a purchasing party. These relationships and strategic partnerships maintained by the buyer will affect long term sustainability and innovation for an organization. The buyer-supplier relationship is one of great importance, as discussed later, to help nurture and implement sustainable strategies throughout an entire supply chain (Carter & Jennings, 2004).

2.2.1. The Theory of Sustainable Supply Chain Management

What is meant by the most popularized word in industry today?

Sustainability does not have a concrete definition or set of qualitative benchmarks, but this is to be expected with a new concept. Due to sustainability being able to breach interdisciplinary lines there has been a large population of researchers and industry professionals alike trying to define the term sustainability (Gladwin, Kennelly, & Krause, 1995). The majority of industry use the definition presented by the Brundtland Commission (World Commission on Environmental and Development, 1987); "development that meets the needs of the present without compromising the ability of future generations to meet their needs." As many look to this definition to give a definitive answer, there are still several questions this definition does not answer as Linton et al. (2007) pointed out:

- What resources will future generations require?
- At what levels can pollutants be released without having a negative effect on future generations?
- To what extent will new sources be identified in the future?
- At what level can renewable resources be exploited while ensuring that these resources remain renewable?
- To what extent can technology address sustainable use of resources with continued increases of material wealth?
- To what extent can market forces drive sustainability?
- Do lifestyles need to change and if so how?

• What sorts of policies are required to achieve sustainability? (p. 1076)

These questions are what has spurred further development on the definition and the debate between physical, biological, and social science communities. To what extent do we try to procure and protect resources, what resources need protection, and is there a substitute resource that society can transition between (Ruttan, 2001)?

Another definition presented by Bakshi and Fiskel (2003):

"A sustainable product or process is one that constrains resource consumption and waste generation to an acceptable level, makes a positive contribution to the satisfaction of human needs, and provides enduring economic value to the business enterprise." (p1350)

There are still some key problems with this definition, like the use of the word acceptable (Bakshi & Fiksel, 2003). What is an acceptable level and who determines it? Dow Jones has created a sustainability index which included only public organizations that have incorporated the concept of being sustainable into their business practices and strategic goals. The Dow Jones defined corporate sustainability as, "a business approach to create long-term shareholder value. Sustainability leaders embrace opportunities and manage risks which derive from economic, environmental and social developments."

The Dow Jones Sustainability Index (DJSI) was the first to distinguish publicly held organizations that believed in sustainability and implemented it into their core strategy. The main concept of sustainability is protecting one's organization from any threat that may disrupt normal business activities. By looking ahead an organization can protect their product from being eliminated due to scarcity of resources or increased legislative regulations. An organization can protect itself from these threats by implementing

changes with material substitution or implementing more practices that do not degrade the environment of a resource (Carter & Rogers, 2008). To truly be sustainable an organization must eradicate any and all risks to their business. An organization is only able to do this by looking to the three pillars that define sustainability: environmental, social, and economic responsibility. Only when business practices accommodate all three areas can an organization truly be sustainable (Carter & Rogers, 2008). These three pillars are also described as an organization's triple bottom line performance (Elkington, Autumn 1998).

It is important to see how the concept of sustainability came to be the industry presence it is today and for that we need to go back to when it first came into print back in 1962 when the International Institute for Sustainable Development (IISD) published Carson (1962). The article discussed the interaction between the use of pesticides and the damage it had on the surrounding ecological systems. From there the topic of sustainable development took off. Azapagic and Perdan (2000) placed industry's action and progress of sustainable development into three different phases in the United States from the early 1970s to the late 1990s.

The first phase was from 1970-1980 and was categorized as end-of-pipe solutions mainly brought on by regulations from the Environmental Protection Agency (EPA) for industry to reduce the amount of pollutants entering into the air. This phase quickly ran its course when industry soon realized the cost associated with installing the new technology and when it did not add value to their products or their bottom line; organizations soon changed their thinking from a reactive state to a proactive state and started to look at the main causes of the pollutants in their processes. This reduced waste

and increased value of their products all the while eliminating harmful pollutants (Sharma & Henriques, 2004). This thus began the second phase described by Azapagic and Perdan (2000). The second phase was from 1980 to early 1990s. Azapagic and Perdan (2000) described it as business' beginning to see how being eco-friendly could positively affect their bottom line. The third phase involved companies taking a public stance on environmental performance by inserting their promise to become more environmentally friendly into their business strategies and annual reports. Annual environmental reports went from 13% to 24% between the years of 1993 and 1999 (Azapagic & Perdan, 2000).

Another important issue to understanding the concept of sustainability is the idea that the concept of sustainability is dynamic not static. An organization can never be truly sustainable for long without change because what was once a plentiful resource may in the future become in danger of being extinct (Faber, Jorna, & Van Engelen, 2005). When sustainable practices are implemented into an organization's strategy it can pay off huge financially in the long run. Sustainable initiatives and practices have their biggest impact when implemented into the organization's supply chain management (SCM) activities.

An organization's supply chain has many differing definitions changing from organization to organization depending on how many upstream and downstream participants are in the supply chain. Most defined the supply chain (SC) as the activity which encompasses all value added processes from the extraction of raw materials to the delivery of the product to the consumer (Mabert & Venkataramanan, 1998; Linton, Klassen, & Jayaraman, 2007; Sarkis, 1999). This definition covers the traditional sense (Figure 2.1) of SC (open-looped) but now the literature is suggesting a more sustainable SC (closed-loop) that extends passed the end-user and increases an organization's

responsibility to their products that encompass the collection, remanufacturing, and redistribution of the product for resale (Figure 2.2). This continuous cycle helps lower the demand for new virgin material as well as reduce waste that finds itself at the landfill (Beamon, 2005; Linton, Klassen & Jayaraman, 2007). There are uncertainties and an added element of complexity when attempting to change an open loop supply chain (traditional) to a closed loop (extended). Some of the uncertainties are due to extended warranties and buy-back policies, and organizations cannot predict quality, quantity, or timing of products returning to their collection depots. Then the question becomes how does an organization store, package, and ship the returned or collected items (Linton et al., 2007; Beamon, 1999). These uncertainties should not be taken lightly when considering changing from an open-loop to a closed-loop. If done improperly the organization can cause more bad than good to the environment and their brand image. To become eco-friendly an organization must look at the external costs that are presented to society when transporting consumer and industry goods (e.g. noise, air and water pollution, congestion). These costs bring with them harsher legislative restrictions and the depletion of natural resources (e.g. clean water and oil).

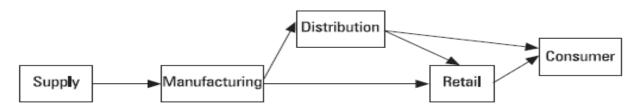


Figure 2.1.: Traditional Supply Chain, Source: (Beamon, 1999)

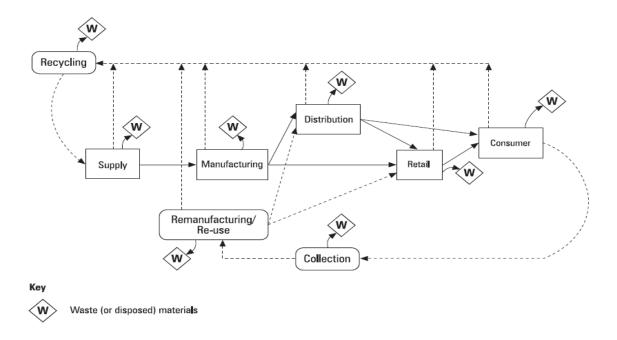


Figure 2.2.: Closed Supply Chain, Source: (Beamon, 1999)

For this study the term supply chain and supply chain management used the definition presented by Handfield and Nichols (1999). The reason for using this particular definition and not one of the tens of thousands one can find from a simple online search is because this definition is also comprehensive acknowledging both upstream and downstream parties and the relationships that are involved, which many of the simpler definitions do not clearly state. Though this may be a dated definition in terms of when it was conceived, the use of a supply chain has not changed. Also, this definition is cited in many of the peer reviewed journal articles reviewed for this study. The definition is,

"all activities associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated information flows. Materials and information flow both up and down the supply chain. SCM is the integration of these activities through improved supply chain relationships, to achieve a sustainable competitive advantage."

The definition provided by Handfield and Nichols (1999) showed the movement towards sustainable supply chain management (SSCM). SSCM is what many researchers and industry professionals are now calling the new way of managing one's SC. SSCM is about the relationships built between supplier and buyer and using every party's core competency in the SC to create a leaner and more efficient SC. The buyer-supplier relationship can be the most important power one has on changing another organization's perception and policies on sustainability (Green, Morton & New, 1998; Vasileiou & Morris, 2006). Rao (2002) explained how an organization needs to incorporate a long-term strategic relationship between the supplier and the customer into the early processes of designing the products and manufacturing processes. This is the best way to efficiently reduce waste throughout the production process and limit the risk of supply disruptions. Now that a conceptual foundation of what sustainability and SSCM has been formed, the next section relates to how the purchasing department can impact the triple bottom line of an organization.

2.2.2. The Buyer's Role

The easiest way to implement sustainable practices is through the purchasing department, more specifically the buyer. The SC begins with the buyer's decisions of where, who, and what to source from outside the organization. The role of purchasing was defined by Dobler and Burt (1996, p. 35) as "the essential activities associated with the acquisition of materials, services, and equipment used in the operation of an

organization". Green purchasing has been defined as an environmentally conscious purchasing practice which aims to ensure the items purchased meets the environmental objectives of an organization (Carter & Ellram, 1998; Min & Galle, 2001; Zsidisin & Siferd, 2001). The decisions a purchasing department makes impacts the overall logistics of the SC, product design, supplier selection and grading, procurement of transportation, and the management of inventory and supplier relationships (Bowersox, Daugherty, Dröge, Germain, & Rogers, 1992; Carter & Jennings, 2004; Cavinato, 1992; Gentry & Farris, 1992; Lambert & Stock, 1993).

Though today a buyer can affect the sustainability of the SC, this has not always been the case. The role of a buyer has changed throughout the decades in the United States from a simple clerical job in which product price was the number one or only priority into a position responsible for not only getting the most competitive price but also safeguarding the organization's reputation.

In the 1950s the role was perceived as clerical. The buying organization looked mainly upon the price of a product when choosing a supplier. As the United States started to move into the 1960s suppliers started to market themselves to their customers and tried to differentiate from their competitors. This allowed for buyers to start looking not only into price but also efficiency of the supplier (i.e. on-time delivery, capabilities, etc). In the 1970s, buyers shifted towards looking at the quality of the product as well. The suppliers who tried to eliminate defective parts were sought as leaders in sustainable development during this time. Buyers were beginning to not look at price but moreso the overall cost of the part. By the 1980s suppliers who were able to be more flexible with what they produced and what was demanded were highly sought after. Lean practices

were beginning to influence the way producers manufactured. The objective of lean was to create an efficient and organized process that eliminated any non-value activities. This process was devoted to continuous improvement and the elimination of all forms of waste (Womack, Jones, & Roos, 1990). Buyers at this time were dealing with inflation in the market and focused more on the supplier's capabilities and competencies to help bring down costs. In the 1990s, buyers needed to become more flexible to change with the consumer markets which in turn so did the suppliers. Around this time the emergence of sourcing to international markets and the world economy came to light which allowed for strategic partnerships to form. Now in the 2000's a buyer must see the holistic view, with increased public scrutiny from around the globe it is now important for a buyer to factor in countless variables when selecting a supplier (Faber et al., 2005). This holistic view is a critical part of sustainability (Vasileiou & Morris, 2006; Hutchins & Sutherland, 2008). An organization cannot view their suppliers solely. An organization must view their suppliers' suppliers to make sure everyone is cooperating ethically and within local and global standards (Hutchins & Sutherland, 2008). When selecting a supplier who is abiding by all local regulations it is important for the buyer to be cautious when a supplier is just meeting the qualifications of current legislation like the Clean Air Act or just meeting an organization's standards as with ISO 9000/14000 requirements. An organization has to see the damage they cause and try to reduce it so future legislation will not be created, which could end up costing an organization millions in fines and remodeling costs (Porter & Van der Linde, 1995).

The buyer is able to influence a supplier to reduce the environmental and economic impact seen on an organization's triple bottom line. The buyer can request the

supplier to incorporate several different aspects into a product as listed in Eltayeb and Zailani's (2009) article:

- Product requirements (e.g. green attributes like 90% needs to be able to be recycled)
- Product restrictions on what the product can contain (e.g. types of packaging),
- Product labeling or disclosure
- Supplier questionnaires for continuous monitoring
- The implementation of EMS
- Certifications (e.g. ISO 14000 or EMAS)
- Annual environmental compliance auditing. (p. 97-98)

The purchasing personnel in the majority of organizations throughout the United States are already using sustainable practices by participating in cross-functional teams that save millions of dollars from the reduction of waste and protection of a product's brand image. Some sustainable practices have been in implementation for decades such as lean production/ manufacturing (Womack et al., 1990), life cycle analysis (LCA), and product life extension (remanufacturing) (Bakshi & Fiksel, 2003). Organization's product development programs are now becoming more involved with their suppliers and the boundaries of organizations are beginning to blur. Organizations are finding by incorporating suppliers into the initial steps of product development they are able to use their suppliers' competencies as a competitive advantage to reduce cost and waste from their product. Even though many organizations are participating in such activities they

are not achieving the optimal outcome. More training is needed for both the supplying and buying organizations to fully achieve sustainability (Bronstad & Evans-Correia, 1992; Carter et al., 1998; Hendrick,, Carter & Siferd, 1996). Employees with more training on the topic of sustainable purchasing should conduct business and purchasing decisions based on the principles of sustainability because they believe it to be the most advantageous avenue and not for the organization's incentives or policies.

An organization has a societal obligation and responsibility to the community in which it operates. By focusing and giving back to a community by either sponsoring a charity event or increasing their supply base to include a higher percentage of woman and minority-owned businesses (WMOB) which are based locally instead of choosing a foreign supplier or large corporation based out of the local area, the organization will see an increase in brand image and will be reinvesting in their human capital. This will also allow the reduction of the carbon emissions entering the air due to reduction of distance for the transportation of materials.

For sustainable purchasing to occur an organization must view the impact made when purchasing from their suppliers who do not incorporate sustainable business practices. By keeping these suppliers in business and not pressuring them to change, the purchasing organization is participating in unethical practices which can put the organization in jeopardy of supply disruptions and cost an organization millions in market share or fines (Roberts, 2003). Drumwright (1994) defined "socially responsible organizational buying is that which attempts to take into account public consequences of organizational buying or bring about positive social change through organizational buying behavior (p. 1)." Socially responsible organizational buying is more widely

known as purchasing social responsibility (PSR). It is vital for an organization in its self interest to increase transparency to mitigate any possible risks from the manufacturing processes of their product (Carter & Rogers, 2008). Several organizations have set up standards for firms to follow for ethical sourcing to make sure money is not going to support a war or the disregard of human rights (e.g. the Fair Labor Association (U.S.A.), Ethical Trading Initiative (U.K.)) (Roberts, 2003). PSR incorporates five areas to consider during supplier evaluation and selection (Carter, 2004; Hutchins & Sutherland, 2008):

- Diversity
- Environment
- Human rights
- Philanthropy and community
- Worker safety

Now buyers must factor in more than price and quality when selecting a supplier. The development of strategic partnerships and long-term relationships are most valuable to an organization seeking sustainability.

2.2.3. Partnerships

An organization must rely heavily on their individual employee's ethics for the organization to become socially responsible. The one thing that jeopardizes ethical sustainability is the intrinsic opportunistic behavior inside every individual to be better than their competition. This can lead to dealings with suppliers who are not fully transparent in how they have ascertained their products or have cut a few corners to make

up for overhead cost. This can lead to costly unneeded monitoring from an outside source (i.e. government officials, third party consultants). By creating an ethical culture an organization can create an advantage against their competitors because the cost for the personnel, the work hours, and the supplies that go into a monitoring system would be superfluous (Carter & Rogers, 2008). Trust is important when talking about influencing another organization to change its ways of doing business. Strategic partnerships formed between the organization and external stakeholders are built on trust and the mutual understanding that both organizations work towards a mutually beneficial goal. Each organization must be certain the other party has their best interest in mind and rely on each other's core competencies so to learn and innovate from each other (Simpson & Power, 2005). With trust comes transparency to one another, which translates to suppliers and distributors willingness for audits and frequent visits from all parties involved in the SC to help monitor and evaluate (e.g. check and balance system) (Rao, 2002).

There are two types of partnerships "adversarial competitive" and "collaborative partnership" (Lamming, 1993). The adversarial competitive partnership is one based strictly on lowering the price of a product and is formed with a short term contract (Shapiro, 1986). With this type of partnership the buyer has a large number of suppliers for the purchased product and does not need to spend a large amount of energy with a supplier to move them towards sustainable practices because if one supplier cannot comply with an organization's requests the buyer can simply find another supplier who can. Therefore the partnership does not make direct use of the competencies of the supplier (Humphreys, Shiu & Chan, 2001). Collaborative partnerships on the other hand, which began to increase in popularity around 1987, require the necessary trust and

commitment needed to implement SPP. The tangible and intangible benefits of these partnerships are listed out in Humphreys' et al. (2001) paper.

<u>Intangible-</u> senior management commitment, trust, flexibility, teamwork, and patience

<u>Tangible-</u> reduced costs, adopting total quality management, zero defects, on-time payments, joint research and development, electronic data interchange, faster time to market, on-time deliveries (JIT), reduction/elimination of stock (p. 154)

The amount of interaction between two or more organizations can bring along costs that must be weighed in the decision when forming a partnership. This cost is referred to as the transaction cost theory. The cost associated with risk of allowing another organization access to your processes and information that could cause the other organization to learn and gain a competitive advantage against you or the investment in the partnership shows little return value if the partnership dissolves and another supplier is needed in the future (Williamson, 1981). The foundation of trust in a relationship can never be too strong. As stated before many partnerships fail due to the opportunistic behavior of one party in the relationship (Morgan & Hunt, 1994).

Some may argue the use of long term committed supplier relations could become a hindrance to the buying organization because the advantage and clout of moving their purchasing power to another supplier, if the current supplier is not as efficient or is in some way not committed to cost reduction, is lost. But if the relationship is truly sustainable the supplying and buying organizations should be able to come to a mutually competitive agreement (Green et al., 1998). Organizations must come to terms one entity

can only accomplish so much on their own and only with the use of a strategic partnership can both organizations reach their full potential and a win-win situation is created (Green, Morton & New, 1996; Anderson & Narus, 1990; Morgan & Hunt, 1994). The future for SSCM will be organizations with a smaller supply base but stronger and more dependable relationships (Hutchins & Sutherland, 2008).

Suppliers are sources of ideas, technology, time savings, energy, materials, and money; and act as external consultants. The buyer is a strategic facilitator, working with the SC to bring bottom-line contributions, which add to the system's competitive advantage. Synergy between these two main contributors is what defines the principals of green purchasing. The supplier-buyer relationship is very important to the progression of a sustainable supply chain. Every member has their own core competences and when all members of a SC are actively participating there can be tremendous impacts on the triple bottom line. Simply by collaborating on product stewardship can have a large impact on waste and cost reduction. Product stewardship includes activities such as reverse logistics, product recovery, and remanufacturing, the design of the product will affect all the processes that follow from the manufacturing of the product to the type of packaging used to transport it. The designing of a product is a key focus to have a big environmental and economic impact (Bakshi & Fiksel, 2003).

Recently, there is an increasing trend for organizations to also form strategic partnerships with NGOs. These relationships can be mutually beneficial. While the NGO is able to have their point heard by large organizations and help spur change, the large organizations is able to view the main concerns of the local community and do not have to invest the use of their own resources to survey or even combat a local disturbance. The

organization and NGO can work together to provide positive marketing campaigns and avoid any harmful ones (Elkington, 1998). NGOs and universities can also help to keep the organization's future bright and the flow of innovation continuous (Bakshi & Fiksel, 2003). Knowledge is the most important factor behind the scenes of sustainability in that without keeping a focus on bringing in new knowledge, we as a society will hit a ceiling for new innovations (Ruttan, 2001).

2.2.4. Implementation of SPP

There are several obstacles an organization needs to overcome when thinking about the implementation of SPP:

- High cost of environmental programs
- Uneconomical recycling
- Uneconomical reusing
- Lack of management commitment
- Lack of buyer awareness
- Lack of supplier awareness
- Lack of company-wide environmental standards or auditing programs
- Loose state environmental regulation
- Loose federal environmental regulation (Min & Galle, 1997, p. 16)

Many of these obstacles can be overcome by simply educating the purchasing department which will create the trickle-down effect of knowledge from buyer to supplier. After educating the buyer it is then time to educate the supplier.

There are many positives to implementing SPP, cost reduction due to the elimination of extra material, increased organization reputation and brand image, improved innovation, faster time to market, lower overall cost for the organization's supply chain, lower risk of supply chain disruptions, elimination of fines due to regulations, and improved worker safety (Rao & Holt, 2006). A few of the economic benefits of becoming sustainable are reduced product life cycle costs, cost avoidance from purchasing, storing, or depositing hazardous materials, avoidance of fines for environment damage, and reduction in health risks for employees which will reduce number of missed days, increase morale, and increase productivity (Beamon, 1999).

The purchasing department can easily implement SPP when it comes to evaluating, selecting, and retaining suppliers. To implement SPP successfully the buying organization needs to be well trained on SPP and top management needs to be behind the initiative. The buyer must also have influence over their suppliers which is used to persuade them to implement sustainable practices. Pressure on a supplier to improve does not come solely from the buyer but also from many other stakeholders in the process, discussed in the following section. If the buyer is able to change just one of their suppliers this will create a multiplying effect throughout the SC (Walton, Handfield & Melnyk, 1998). This has been characterized as a multiplier effect when the buying organization is able to change one of their suppliers who in turn changes who supplies them which in turn changes the sustainability of all products from those suppliers and the sustainability of the suppliers' customers. This can lead to an enormous ripple which allows for a more efficient SC to reduce costs and increase competitive advantage for both the buyer and supplier (Rao, 2002; Hutchins & Sutherland, 2008; Hamner, 2006;

Preuss, 2001). Green purchasing comes down to two main activities, the monitoring of suppliers' environmental performance and educating suppliers to improve their performance (Rao & Holt, 2006).

The need for buyers to train their suppliers on environmental management strategies is evident when one reads through the numerous case studies on this topic. Financial and environmental success can be obtained when a buyer takes the time to improve the awareness of their suppliers. For example, when Procter & Gamble worked with their suppliers on the refill system for compact detergent powders and saved 90% of the packaging material used for the primary package (Green, Morton, & New, 1998). One other example can be found with the Ford Motor company who requested all of their suppliers with manufacturing facilities obtain a third-party certification of environmental management systems (EMS) for all of their plants by 2003. Ford helped their suppliers by offering awareness seminars and training (Zhu & Cote, 2004). The top-down approach needs to be used when convincing a supplier to use sustainable practices and to invest in new technology like EMS. Buyers need to convince their suppliers' top management first in order to get the commitment. A buyer must show the cost savings that can be realized from reducing emissions and continuous innovation of their manufacturing process. This is more likely to change the practices of the supplier than talking about the environmental harm they are causing. Businesses are created to make profits for their stakeholders and unless a buyer is able to show how implementing sustainable practices can impact the bottom line in a positive way, the supplier is not going to willingly change (Hamner, 2006). This draws upon the issue of resource constraint. There is a direct correlation to

how much time and energy a buyer spends with a supplier to how much cost reduction and innovation can be achieved (Hamner, 2006).

To monitor the performance of a supplier the use of environmental management

systems is needed. EMS allows for a buyer to monitor and regulate the impact a SC has on the environment and can be used to benchmark and set goals for an organization year after year. Attitudes towards the use of EMS have changed over the decades.

Organizations viewed the use of EMS as a necessary evil to accommodate government regulations, but slowly organizations are starting to view these systems not as a cost center but as profit centers. The use of EMS helps protect against fines, defamation of reputation and as a source to monitor process improvements. These attitudes changed due to the external pressures of the media, government officials, and stakeholders alike. The attitudes towards EMS have been characterized into six different organizational approaches starting from most resistant to most proactive (Walton et al., 1998):

- Resistant adaptation
- Embracing without innovating
- Reactive
- Receptive
- Constructive
- Proactive

The first three responses will minimize exposure of harmful pollutants while the last three responses look at eliminating the process at which pollutants were created. If top management has the last three types of responses then implementing the use of EMS should not come with any internal obstacles but if top management has the first three

responses to new regulations then more education on the matter of sustainability is needed before the implementation of any SPP or EMS.

Hamner (2006) gave notice to the Global Environmental Management Initiative (GEMI). The program aids the sustainable cooperation between buyers and suppliers.

GEMI laid out a four step process which starts at compliance and finishes at a total quality approach. Cooperation and trust between supplier and buyer is once again key for supplier sustainability practices and SPP to be implemented.

Listed below are the four steps of GEMI taken from Hamner's (2006) paper:

- Performance Level 1: Compliance Company reviews and gives
 preference to suppliers that comply with environmental, health and safety
 laws and gives preference to suppliers that match the company's
 environmental policies and standards.
- Performance Level 2: Systems Development and Implementation System
 exists to evaluate potential suppliers' environmental policies. Suppliers
 who do not comply with environmental policies are dropped.
- Performance Level 3: Integration into General Business Functions Supplier selection models are integrated with environmental priorities. A coordinated approach for evaluating suppliers is followed by all business units.
- Performance Level 4: Total Quality Approach Corporation gives
 preference to suppliers who accept and implement sustainable principles.

 Supplier evaluation system considers their environmental management,

quality improvement systems, and suppliers are continuously being evaluated for consistency with the corporation's environmental policies. Company collaborates with suppliers to identify and implement appropriate improvements in the corporation's and suppliers' EMS. (pp. 26-27)

If the partnership is strong and the buying organization feels that investment in their supplier is beneficial to them there are many ways for the buyer and supplier to move towards a leaner and more competitive SC. Rao and Holt (2006) listed out how a buyer can implement sustainability practices with their suppliers:

- Holding awareness seminars for suppliers and contractors
- Guiding suppliers to set up their own environmental programs
- Bringing together suppliers in the same industry to share their know-how and problems
- Informing suppliers about the benefits of cleaner production and technologies
- Pressuring suppliers to take environmental actions
- Choose suppliers by environmental criteria. (p. 902)

A major hurdle for the implementation of SPP was mentioned previously and that is the resource requirements. An organization needs to dedicate a number of human resources to monitor and train their suppliers. If an organization does not have the resources to dedicate to the process, then a third party who has the competency to monitor, grade, and educate their suppliers needs to be brought in. Larger organizations

have a higher rate of success with implementing SPP compared to small and medium enterprises (SME) due to the simple fact larger organizations can dedicate the necessary resources to the process (Min & Galle, 2001; Bowen, Cousins, Lamming & Faruk, 2001). Even if an organization has enough resources to undertake the implementation of SPP many managers still view SPP as having too high of an initial capital cost to see any quick returns (Min & Galle, 1997). This was proven as an incorrect assumption in Carter, Kale, and Grimm's (2000) study on the effects environmental purchasing has on an organization's performance and goals. Legislature will occur with stricter regulations and standards that will make the business case for an organization to seek out the use of SPP. Also, the increase in tax incentives for organizations willing to revamp their old technology will allow for a quicker return on investment (Woodhouse, 2001).

2.2.5. Enforcing foreign compliance

As though implementing SPP through a domestic supply chain was not difficult enough when all parties have the same government regulations and NGO pressures. The implementation of sustainability practices with foreign suppliers becomes even more difficult due to the reduction of communal stakeholders and government mandated regulations to adhere to. The foreign supplier may have lax regulations or no pressure from a NGO to change their working conditions. This all ties back to the buying organization having more clout and being able to show top management that the use of sustainability practices can directly affect their triple bottom line (Hamner, 2006). If a supplier's culture is unwilling to innovate and is deemed resistant to adaptation then the buying organization is taking a great risk keeping them in their supply base. These risks

are not limited to financial or ethical issues but can be operational problems as well. If a foreign or domestic supplier is forced to shut down their operation due to a chemical spill or unforeseen regulation issues this can create a sudden shortage of a critical part or material (Vachon & Klassen, 2006). Buyers also need to take into account the total cost of ownership (TCO) when selecting and retaining suppliers. TCO can include the costs of order placement, selecting a new supplier, logistics, inspection, defective parts due to quality, downtime caused by failure, and disposal costs (Ellram, 1995). If an organization does not require foreign suppliers to become more sustainable than there would be no pressure for a supplier to do so unless it was in their best interest to give back to the community (Carter & Rogers, 2008; Woodhouse, 2001).

2.2.6. Monitoring

The size of the SC, both upstream and downstream, is likely to influence the necessity of environmental monitoring (Geffen & Rothenberg, 2000). For suppliers, ensuring compliance with government regulations and establishing systems to reduce risks associated with environmental issues increases as the supplier incurs a larger market share (Min & Galle, 2001).

The Global Reporting Initiative (GRI) is a main proponent for monitoring and evaluating an organization's sustainability level. As in many service markets there are many other institutions who claim to have best reporting methods for normalization and comparability (Labuschagne, Brent & Van Erck, 2005). Veleva and Ellenbecker (2001) listed the four well-known frameworks for reporting sustainable development: the GRI, ISO 14031, WBCSD, and Center for Waste Reduction Technologies (CWRT). Their

research pointed out the differences and the shortcomings of these frameworks. The two main differences between each of the frameworks were their inconsistency to evaluate the three pillars of sustainability equally and the number of suggested indicators for the use of benchmarking purposes. Vollmann (1996) commented, "it is better to measure the right things approximately than the wrong ones with great accuracy and precision (p840)." GRI and ISO have over 100 indicators that are needed when compiling a report, which would be too cumbersome for a SME to even begin to monitor and dedicate resources. So for a SME to participate in sustainability reporting the SME would need to outsource the responsibility to a third party.

Even though it is cumbersome for an organization to create a sustainability report for their stakeholders, it is beginning to become essential in this current global economy. An organization must show through annual reporting, participation in sustainable practices. This can be difficult when common comparable indicators are not recognized or even known in industry (Labuschagne et al., 2005).

Another reason why SME choose not to participate or report their sustainability practices is because of the belief they do not have a large impact on the environment (Ammenberg & Hjelm, 2003; Hillary, 1995; Simpson, Taylor & Barker, 2004).

According to the US Census Bureau in 2009, 97.6% of exports and 97.1% of imports were conducted by SMEs in the United States. This simple statistic shows the impact SMEs can have on the environment and their communities if sustainable development practices were utilized. Another reason for not reporting is organizations lack the core competencies or the understanding to measure or strategize solutions to reduce their impact on the environment (Ammenberg & Hjelm, 2003; Simpson et al., 2004; Tilley,

1999; Welford, 1994). The financial barrier is another big issue many SMEs cannot hurdle (Petts, Herd & O'Hecocha, 1998; Revell & Rutherford, 2003; Simpson et al., 2004). The simple fact is an organization must provide a basic profit for it to stay in business before the organization can start thinking of how to help others. If the organization is unable to make a profit then there will be no need to part take in sustainable development because it will not be around long enough for its impact to be noticed (Labuschagne et al., 2005). These two reasons of lack of supplier awareness and financial resources is why it is important for large organizations to form partnerships with SMEs and invest through training and capital support to develop a more environmentally conscience SC.

2.2.7. Stakeholder's Influence

Many industry experts agree stakeholders play a major role in pressuring an organization to create a sustainability report and monitor their environmental impact. Without those stakeholders an organization has no incentive to do so. This is why it is vital to have continuous communication between buyers and suppliers to develop only indicators most interest to all stakeholders, but in many situations this communication never takes place (Fiksel, McDaniel & Mendenahll, 1999; Lawrence, Collins, Pavlovich & Arunach, 2006; Sangle & Babu, 2007).

The buying organization is not the only external pressure needed in the equation of implementing SPP throughout the SC. External stakeholders (e.g. government officials and NGOs) are needed to help monitor and enforce the use of SPP and sustainability practices. Globalization has given the public tremendous power and knowledge about

who an organization partners with. An organization can no longer take the risk of the public finding their sourcing decisions were made unethically. With the increasing media attention on big businesses more and more organizations are turning to sustainability concepts to help with image control and reputation (Googins, Mirvis, & Rochlin, 2007; Rao & Holt, 2006; Roberts, 2003).

"The extent to which supply chain members' reputations and image can be tainted by the actions of another member who engages in activities that result in public sentiment or outcry or, even worse, is accused of criminal behavior where liability extends up and down the supply chain (Spekman & Davis, 2004, p418)." ors, communities, and consumers, to name a few, create a growing demand for a

Investors, communities, and consumers, to name a few, create a growing demand for a standardized list of indicators that would allow for easy comparability between companies and even industries (Veleva & Ellenbecker, 2001). Sangle and Babu (2007) categorized stakeholders and presented research in the area of evaluating stakeholder satisfaction. The categories of stakeholders include regulatory authority, financial institutions, employees, consumers, neighborhoods, and governments. Stakeholder satisfaction is very important to an organization's survival. In Sangle and Babu's (2007) research, they uncovered a way of measuring and recording the many different stakeholders of an organization. Sangle and Babu outlined the importance for an organization to continually monitor their stakeholders and improve satisfaction levels, especially for the stakeholders they are dependent on. Sharma and Henriques (2004) created a study that proved stakeholders do influence the sustainable development practices by which an organization abides. The authors created a quadrant, based off of Frooman's (1999) research on stakeholder dependence, with stakeholder's dependence on

a firm, graded from high to low, on the horizontal axis and a firm's dependence on stakeholders, graded from high to low, on the vertical axis.

Table 2.1. Resource dependence between the firm and stakeholders and stakeholders influence strategies (Sharma & Henriques, 2004)

Firm's dependence	Stakeholder's dependence on firm	
on stakeholders	High	Low
High	Interdependence	Stakeholder power
	Customers	Regulators/government agencies
	Investors/shareholders	End consumers
	Financial institutions	Media
	Insurers	Local communities Activist
	Trade associations	shareholders
	Local communities	
	Suppliers	
	Managers	
	\	↓
	Direct-usage influence	Direct- usage/withholding influence
	strategy	strategy
Low	Firm power	No interdependence
	Suppliers	Environmental & Social NGOs
	Employees	Special interest groups/activists
		Aboriginal groups
	1	International regimes (UNEP, Kyoto)
	▼	\
	Limited influence	Indirect withholding influence
		strategy

By the use of Table 2.1 the authors are able to illustrate how different stakeholders can influence an organization's practices. If the stakeholder has a low dependence on the firm (meaning the firm has a high dependence on the stakeholder) then the stakeholder can make mandates. For example, a consumer would be able to create bad publicity for a company and thus create a decline in demand. If these dependency roles were reversed (the stakeholder has a high dependence on the firm) then is would allow for the firm to push mandates onto the stakeholder. An example of this situation is if the stakeholder is a supplier in a non-competitive market this would allow the buying organization to influence the supplier and mandate any practices the buying organization sees fit into place. The buyer is able to enforce this because the market has many adequate suppliers for their needs; the product in this case would be standard or not complicated to manufacturer.

Studies have shown that organizations that have a reputation of moving towards more environmentally sound practices and ideology have seen an increase of the demand for their product. The perceived value added to an organization becoming more environmentally friendly is enough for a consumer to choose their product over another. A study done by Lamming and Hampson in 1996 showed an estimated 75 percent of American consumers say their purchasing decisions are influenced by an organization's environmental reputation while 80 percent said they would pay more for eco-friendly goods. At the same time the organization runs the risk of publicizing they are of becoming greener and fail to do so. This can ruin an organization's reputation and cost millions in annual income (Croom, Barani, Belanger, Lyons & Murakami, 2009).

2.3. Summary

In this global economy the need to become lean and reduce waste while providing basic human needs and maintain corporate responsibility is critical for the United States. With the leveling of once thought competitive advantages, it is important for industry to set themselves apart from many developing countries. The only way for an organization to become sustainable is through their SC. This is implemented through the use of long term relationships and the use of sustainability practices by all parties in the SC both upstream and downstream from the initiating organization. The buyer has the critical advantage to enforce and monitor sustainability of the SC through the use of SPP. Even though with many perceived obstacles that stand in the way of sustainability practices and SPP the use of education on sustainable development can hurdle many of these obstacles. Sustainable development practices as an organization's core competency and strategy are key to the future success of American organizations. If organizations choose not to become sustainable or do not participate in SPP there are the risks of increased government regulations, loss of market share due to poor reputation, increased SC disruption and an increased emission tax (Krikke, Bloemhof-Ruwaard & Wassenhove, 2003). The reoccurring theme of this section is an organization is no more sustainable than its SC, that is, an organization is no more sustainable than the suppliers it selects and retains and can no longer just worry about their individual role in the SC (Krause, Vachon & Klassen, 2009). The need to manage short-term financial results and risk factors a product can cause (i.e. environmental waste, and worker and public safety) and manage the long-term financial results such as those that are associated with depleting natural resources which cause profit margins to shrink and manufacturing cost to increase can be accomplished with the use of sustainability practices to make sure an organization is aware of the possible risks (Shrivastava, 1995; Carter & Rogers, 2008). A buyer's decision to source unethically can cause incalculable disruptions in an organization's SC. For instance, if a critical supplier's plant closed either due to a chemical spill because of the mishandling of hazardous chemicals or an employee revolt due to unfair working conditions. The buying organization would not just lose the material needed to manufacture their product. They would also lose time, resources, organizational morale, market share, and many other negative externalities.

As organizations become more sustainable and efficient this allows for increased profit margin but also the reduction in market prices. The reduction in market prices allows for increase demand which will lead to what is known as the rebound theory. An industry example of the rebound theory is present in the United States car industry. Car manufacturers are listening to the current demand to make cars more fuel efficient, to reduce carbon emissions and to save the consumer money at the pump. This innovation allows cars to travel farther on less which was intended to reduce carbon emissions and save the consumer money, but instead this innovation has had a reverse effect. Society saw this as an opportunity to travel farther for less instead of traveling the same distance for less. This created the same usage if not more of gasoline was being consumed creating the same or more carbon emissions into the environment. So what was seen as a way to manage carbon emissions in the environment given off from car exhausts actually had the reverse effect due to society's nature tendency to over consume this innovation was seen as a wash in the big picture of environmental preservation (Bakshi & Fiksel, 2003).

Society is programmed for overconsumption. A demand created by governments, stimulated with tax breaks for businesses to build new buildings and the buying of new equipment is what organizations must supply because without doing so the organization would not remain competitive and would be forced out of the market (Woodhouse, 2001). The only way to battle increasing demand is to become more efficient and leaner throughout a supply chain. This can only be accomplished when SPP are implemented and every party in the SC is educated and monitored on sustainability practices.

2.4. Data Collection

Data for this research was collected via a web-based structured survey. The reason for collecting the data via an online survey is participants are more likely to return a completed survey via online rather than mail. This also reduces the cost and time of mailing out the survey to the intended population (Kathrynne A. Newton, personal communication, February 23, 2011). Data are easily analyzed from online surveys due to the use of Purdue Qualtrics which aided in formulizing graphically interpretations of the data. Also online surveys allow for the elimination of error from transcribing the data which aids in the validity of the results. Transcribing error can be found in oral data collection method such as using open ended phone interview questions were the researcher must continuously write the respondent's response as they are receiving it or recording the respondent's answers using a video camera or voice recorder and then writing the response down at a later time. Using an online survey reduces the amount of time it takes to collect the data compared to a mailed survey, physical site visit, or phone interview this is why neither of these methods was chosen. The survey is compiled of 25 possible questions the respondents can answer. The utilization of closed questioning is

for simplifying the analysis of the data and to reduce the amount of time it takes for the survey to be completed unlike with the use of open ended questioning which is open to interpretation of both the responses and the question. Closed questioning allows for a simpler interpretation of the data collected and limits the different responses. Respondents are more likely to complete a survey that does not take longer than 15 minutes to complete (Fowler, 1995; Gillham, 2000). Besides the concern of reducing the completion time and ease of analyzing the data, closed questions allows the respondent not to need precise knowledge to answer the questions confidently. So a respondent is more than likely not have to leave the survey at anytime to find specific data. Those that leave a survey to find data to answer a question are less likely to come back to finish the survey. The issues with the use of closed versus open answered questions is that with a closed response question a misunderstanding of a question cannot be dealt with which leads to poor data quality from that particular respondent (Gillham, 2000). The researcher attempts to battle this by formulating the questions to use a limited amount of jargon and confused wording. Any jargon used is defined in the opening paragraph before the respondent is allowed to continue onto the survey. This allows a common understanding by all respondents. The other issue with closed responses is it makes it impossible for the researcher to understand why a respondent choose one answer over the other which could be done with the use of non-scripted open ended questions via phone interview or physical visit. Once again these options were not chosen due to time constraints of the study.

To disseminate the survey the survived population was sent an email with a short description of the researcher and what the researcher hopes to accomplish through the

survey. This was done to try and bring a humanistic connection between the respondent and the study. If the respondent perceives they are making a beneficial impact on an individual instead of a larger entity the respondent is more likely to complete the survey (Fowler, 1995). The email provided a link for the respondent to click on which sent the respondent directly to the web-based survey. This allowed for the respondent to complete the survey at their own digression which leads to a higher response rate than trying to contact them via phone interview.

The survey was made up of 25 possible questions and should take between 5-10 minutes to complete. The decision was made for the survey to be split up into three different sections: demographic (Q1-10), training on sustainable purchasing (Q11-15), implementation of sustainable purchasing (Q16-25), respectively. Only one section at a time was presented to the respondent. This is done, to reduce the number of variations the surveyed respondents see. If the respondents were allowed to jump around to different questions in the survey it would allow for respondents to see a multitude of variations. This way the researcher eliminated the chance of a respondent seeing a different formation of questions from another respondent. This allowed for more consistency (Crewell & Plano Clark, 2007; Gillham, 2000). Questions 16 to 18 are taken directly from Carter and Jennings' (2002) survey for two reasons. The first being this increases the validity of the survey by using a survey that has been published by a peer-reviewed journal and second being that Dr. Carter and Dr. Jennings have made countless publications on the topic of green purchasing and are seen as experts in this field, which increases the validity of this research as well. The only changes that were made were the reduction in the number of options the respondent had to choose from. In Dr. Carter and

Dr. Jennings' survey the respondent was given a range of 1-7 to answer the question. The researcher reduced the range down to 1-5 simply for the fact that when people are given ranges greater than five they tend to either over exaggerate or under exaggerate their feelings. So the researcher simplified the possible responses to combat this issue (Gillham, 2000). To increase the validity of the survey a pilot test was conducted with Dr. Newton and Dr. Sweeney who are expert researchers. This was done to help make the necessary adjustments to the survey. After the completion of the pilot test the survey was considered valid and sent out to the surveyed population.

The survey leads with the demographic questions so that the simple questions will engage the respondent. Researchers are split on if leading with easy questions allows respondents to feel more confident and engaged in the survey or if it will have the opposite effect. The survey begins by leading with the easier questions and gradually building up to more thought evoking questions to engage and not discourage the respondent which in turn should result in a higher completion rate than if the survey began with the more thought evoking questions (Edward Sweeney, personal communication, November 24, 2011).

2.5. Section Summary

This section detailed the need for benchmarking an industry's awareness and practices of SPP and how SPP can make large impacts to not only an organization's triple bottom line but the entire SC's as well. This section also outlined how the researcher collected their data and defended their position on the solicitation and dissemination of the structured survey.

SECTION 3. FRAMEWORK AND METHODOLOGY

This chapter outlines how the researcher carried out the data collection process, defines the intended survey population, and explains the importance of each survey question.

3.1 Methodology

The study consisted of the researcher surveying the members of the American Supply Association (ASA) population on their awareness of green purchasing practices of their organization. ASA was responsible for supplying a contact list of their members to the researcher. The emails provided by ASA were used to disseminate the survey. Each email contained a brief solicitation for who the researcher is and why the correspondent should complete the survey (See Appendix C). The emails contained a link that the respondents were instructed to click on which brought them directly to the web-based survey. After two weeks the researcher sent out a reminder email to complete the survey if the respondents had not already done so. One week after the reminder email was sent the survey was closed. After data was collected the researcher used Purdue Qualtrics to identify trends and analyze the provided data. A quantitative survey was used to collect the data for analysis (See Appendix A).

3.1.1. Population

The population was members of the ASA. The respondents are employed by a mixture of small, medium, and large organizations from all around the United States of

America, the plumbing, heating, cooling, and industrial and mechanical pipe, valves and fittings industries. The population ranged from professionals with more than five years of experience to professionals with less than two years of experience to find a correlation between the awareness of sustainability practices between those who have been in the field for several years compared to those just emerging from their university studies or newly entering the field. ASA is a non-for-profit organization that assists wholesalers, manufacturers, service vendors, and master distributers. In total there are 3,598 organizations that participate in membership with ASA. ASA incorporates the following industries from the North American Industry Classification System (NAICS): wholesale trade, retail trade, and manufacturing. ASA is an ideal partner for this research mainly for the fact of being a nationally recognized trade association who has members throughout the United States. This helped in two ways. It allowed the researcher to canvas the entire United States and gave opportunity to disseminate the results of the survey to a greater population. ASA is an ideal partner for this research for another reason, due to its pure nature for being in business ASA is there to help educate its members on new trends, technology, and information that can help make their organizations more competitive. ASA also creates a common forum where industry problems can be discussed and resolved between organizations in the same industry.

3.1.2. Factors

The observed factors in this study are displayed in Table 3.1.

Table 3.1. Observed factors

Organization Size	Participation in Environmental Auditing
Annual Revenue	Training on Sustainable Purchasing
Purchasing Work Experience	Buyer's Commitment to Suppliers
Perceived Awareness of SPP	Number of Sustainable Practices Implemented
Industry classification	Importance of Supplier Selection Factors

3.2. Data Collection

Data for this research was collected through the use of Purdue Qualtrics online survey. Each respondent submitted their responses through an online survey that was recorded by Purdue Qualtrics. IRB approval was applied for and granted to the researcher prior the survey being sent out to the study population.

3.2.1. Survey

The survey used in this study answers two questions: What is the current awareness of purchasing professionals in the United States as it relates to sustainable purchasing practices? And how well are they implementing SPP into evaluating, retaining and selecting suppliers (Appendix A)?

The first section of the survey is to collect the demographic data of the respondents. Question one is intended to see how many of the surveyed population are currently purchasing professionals. Question two and three are to find out the level of experience of the respondents. This is important because the researcher is trying to find out who is taking the survey whether it is an experienced professional or an entry level buyer with minimal experience in the purchasing field. Question four helps to answer

whether or not the organizations the respondent works for has outside stakeholders who dictate how the organization conducts business in both the long term and short term. These stakeholders would be seen in publicly held organizations and are the shareholders and the executive committee. Organizations with shareholders are more likely to implement sustainable purchasing practices than privately run organizations because public organizations need to be more transparent. Question five was used to classify the industries that are present in the study. This should allow for a conclusion to be made on why one industry is more likely to implement SPP over another. The categories are taken from the North American Industry Classification System. Question six, seven, and eight are used to classify the presence of small, medium or large enterprises in the study. The categories were taken from reviewing the United States Census categories of firms. These categories are not identical to the United States Census because this study is only attempting to get a general sense of the purchasing party. Question nine was used to find out if the respondent's organization participates in environmental auditing. Environmental auditing is tied to being environmentally sustainable this being one pillar of sustainability. This question was to evaluate if organizations are benchmarking themselves for further improvement. Question ten was used to identify where the supply base of the respondent's organizations are so that the researcher can draw correlation between those who have a large foreign supplier base presence against those who do not to find if there is any difference in the training provided to their employees. Also, an organization may not implement sustainable practices if their suppliers are not mandated by their government to regulate their environmental impact.

The next section of the survey was setup to analyze how well the respondent's organization offers training in the area of sustainability. Question eleven asked what the current level of perceived awareness is of the respondent on SPP. Question twelve questioned whether or not the organization's top management supports or encourages bringing about sustainability into their day to day operations: Questions 13, 14 and 15 are used to find out if the respondent's organization provides training on SSP and whether or not the respondent believes the training would be beneficial. The amount of sustainable purchasing practices being implemented should directly relate to whether or not an organization is training their purchasing department on such practices.

The last section of the survey pertains to the degree of implementation of SPP in an organization. Questions 16, 17, and 18 helped to answer what the current implementation is of SPP in the respondent's organizations. Question 19 and 20 was to examine how the different government regulations and NGOs have on whether a purchasing organization pressures suppliers to adopt more sustainable practices. Question 21, 22, and 23 were used to capture whether the organization is continuously changing and adapting to which is part of being sustainable. The time interval of two years was used because it is believed the majority of buyers do not stay in a current position past two years (Edward Sweeney, personal communication, November 24, 2011). Question 24 was used to evaluate the importance of several factors when selecting a supplier. Question 25 was used to capture whether or not the respondent's organization uses their own influence to sway a supplier towards becoming more sustainable through their own day to day business operations (See appendix A).

The researcher attempted to eliminate social desirability bias by phrasing the questions in a way the respondent answers them about the organization's activities instead of their personal activities.

3.2.2. Analysis

The data is shown through graphs and statistical significance testing. Data was analyzed through the aid of Purdue Qualtrics and Microsoft Excel.

3.3. Section Summary

This section contained the study's methodology for data collection and analysis as well as providing reasoning for survey structure and questions.

SECTION 4. FINDINGS

This section provided the statistical and quantitative analysis of the study.

Through graphical and numeric presentation the researcher presented the data from this study. When the word population is used from this moment on it defines only the respondents of the study and does not apply to the greater population of purchasing professionals in the United States PCHP manufacturing and distribution industry. The analysis was split up into three separate sections: population analysis, current awareness, current practice, and supplier evaluations, respectively.

4.1. Analysis

For this study the response rate was unavailable to calculate do to the nature of dissemination. The emailed survey was sent to the President or Chief Executive Officer of the organizations for them to disseminate further through their organization and without knowing how many individuals received the email it is impossible to calculate a response rate for this study. In all, 260 emails were sent out with a 100% success rate, none of the email addresses failed to be delivered. When the study was completed 38 respondents were recorded as at least opening the survey. Only 33 respondents completed the survey and of those 33 the researcher took 30 respondents because those respondents were currently purchasing professionals in their organizations at the time of the study. The reason for not allowing the other three respondents into this study was due to them

not currently or ever being purchasing professionals at the time of this study, which is the position this study investigated.

4.2. Study Demographic

The population of this study contained 30 respondents all of which currently held a purchasing role within a privately held organization at the time the respondents took the survey. With the use of the NAICS, 93% of the population was from the wholesale trade industry while the remaining 7% were from the retail trade industry. All respondents currently work for organizations that employ 1-500 employees which is accurate for the majority of organizations in the retail and wholesale trade industry according to the United States Census Bureau of 2009. Figure 4.1 and 4.2 displays the population breakdown for annual revenue and annual purchasing volume of each respondent's organization. There was no organization in this study that exceeded \$500 million in either annual revenue or annual purchasing volume.

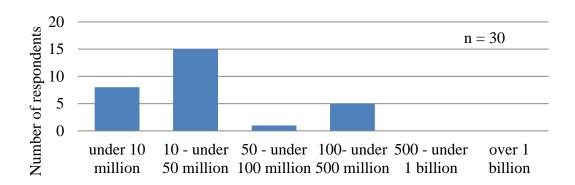


Figure 4.1. Annual Revenue in USD

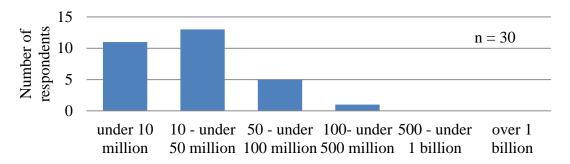


Figure 4.2. Annual Purchasing Volume in USD

Of the 30 who completed the survey 29 are considered experienced professionals because they had more than five years of experience in the field. Only one respondent had two or less years of experience and served as the entry-level professional in this study. Of the experienced professionals, 89.66% of them gained their buyer experience from their current organization for five or more years. The majority of the respondents had 20 or more years with their current organization. Only 3 of the experienced professionals had been with their current organization for one or two years. The one entry-level professional had gained all of their experience through their current organization.

4.3. Sustainability Awareness Analysis

Of the surveyed population only one (.03%) respondent's organization participated in environmental auditing. The one respondent indicated the environmental auditing was completed internally and did not use a third party to conduct the audit.

When asked if their organization incorporated sustainability into their objectives 27% of respondents answered yes while the remaining 70% replied no, leaving one respondent who choose not to answer as seen in Figure 4.3. In Figure 4.4 is the perceived understanding and awareness of sustainable purchasing practices of the population. Only

17% respondents declared themselves with a good understanding, 27% with a bad understanding or no understanding at all, leaving the remaining population undeclared.

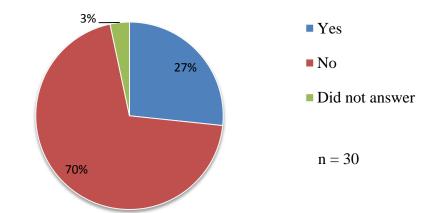


Figure 4.3. Incorporation of sustainability into organization's objectives

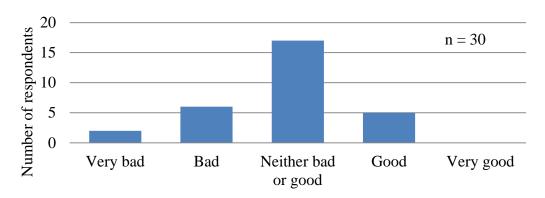


Figure 4.4. Current understanding of SPP

Of the surveyed population 10% of respondents said their organization provided training on SPP while the remaining 90% respondent's organizations did not (Figure 4.5). Of the 10% of respondents who replied their organization provided training; all of them had taken the training. Of the population who's organization did not provide training only 37% of them believed the training would be beneficial, leaving 59% who said the training would not be beneficial and 4% chose not to answer (Figure 4.6).

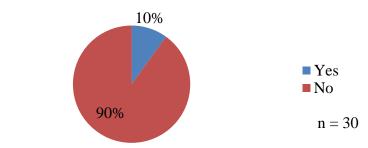


Figure 4.5. SPP training provided by organization

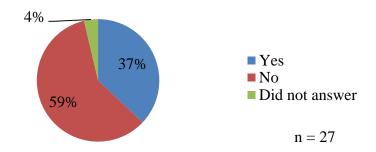


Figure 4.6. Would you benefit from organization sponsored training?

4.4. Current sustainability practice

To find out the current implementation of SPP several questions were asked. Below are two tables to list out the activities the majority, greater than 50%, of the population participated in (responded with a score of 3-5) and did not participate in (gave a score of 1-2), Table 4.1 and 4.2 respectively. Also Figure 4.7 and Figure 4.8 are included to give a better representation of each activity and results from the study.

Table 4.1. Activities the majority of the study population participated in
 Donates to philanthropic organizations
 Ensures safe incoming movement of product to their facilities

 Reduces packaging material

<i>Table 4.2.</i> Activities the majority of the	study population did not participate in
 Ask suppliers to pay a "living wage" greater than a country's or region's minimum wage 	 Ensures that suppliers comply with child labor laws
 Visit suppliers' plants to ensure they are not using sweatshop labor 	 Has a formal MWBE supplier purchase program
 Participates in the design of the products for recycling or reuse 	 Asks suppliers to commit to waste reduction goals
 Participates in the design of products for disassembly 	 Purchases from MWBE
 Uses a LCA to evaluate the Environmental friendliness of products and packaging 	

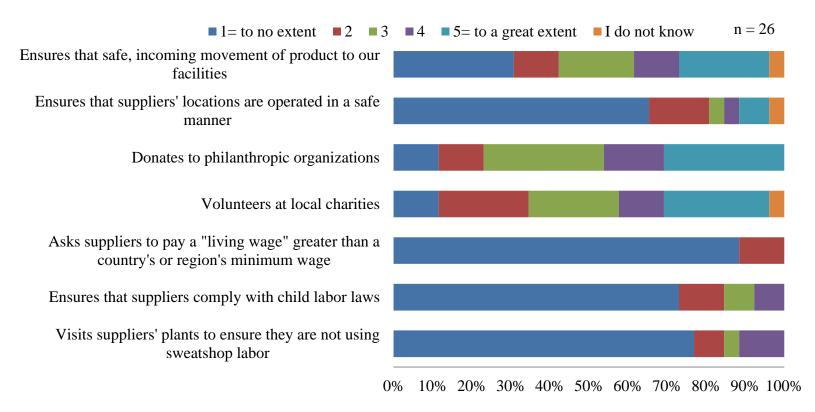


Figure 4.7. Activities the study's population purchasing function participated in

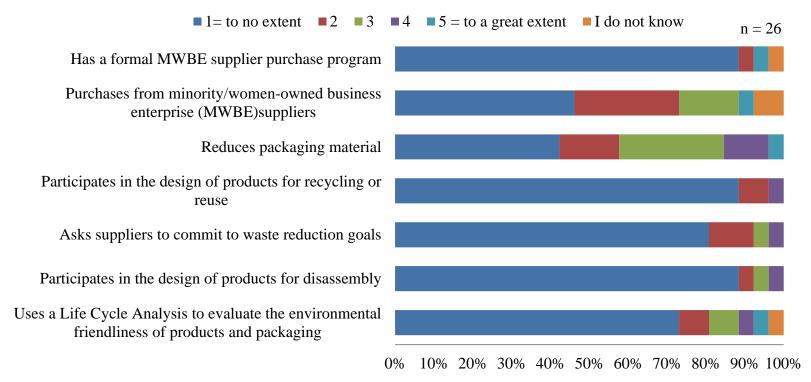


Figure 4.8. Activities the study's population purchasing function participated in

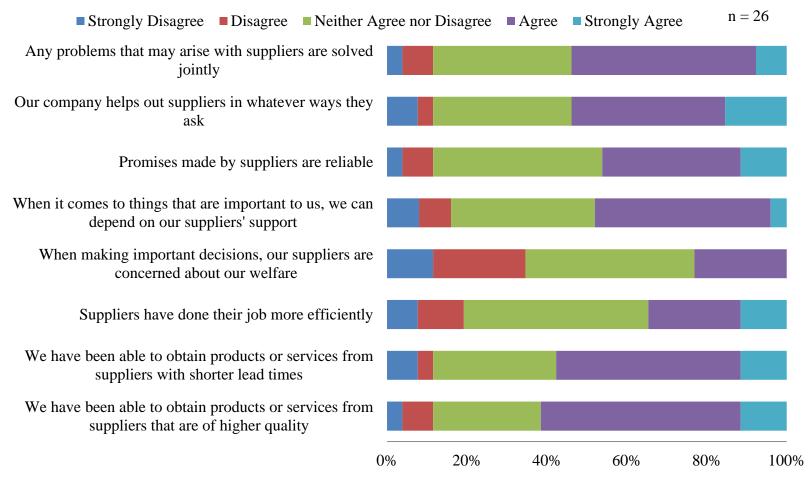


Figure 4.9. Achievements due to Socially Responsible Activities

To find out more about the achievements of this study's organizations through having been socially sustainable a question was posed to see what the population perceived as their organization's achievements through socially responsible actions (Figure 4.9). Due to socially responsible actions the majority of the population solved product problems jointly with their suppliers. The population also helped their suppliers when problems occurred or assistance was needed. Many also believed a promise made by their suppliers could be considered reliable. Though the population was split on whether or not their suppliers would be concerned about their organization if problems arose that did not affect them directly. Even though organizations have incorporated their suppliers into problem solving tasks many believed their suppliers still have not improved their processes to become more efficient. Though the majority of responses replied they have received products or services with shorter lead times and higher quality.

When asked the question about how concerned the population was with working with their suppliers to make their suppliers more socially responsible, 56% replied they are not concerned at all (Figure 4.10).

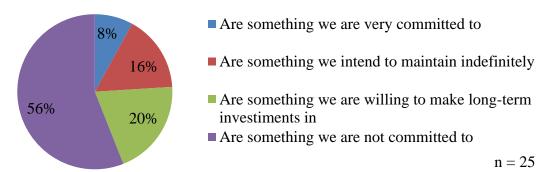


Figure 4.10. Concern to work with suppliers on socially responsible initiatives

When asked the question of how much importance their organization placed on their suppliers practicing sustainability, 52% neither thought it was important or unimportant. While at the same time 36% perceived their organization considered it important for their suppliers to practice sustainability. The remaining population of 12% perceived it was not important for their suppliers to practice sustainability (Figure 4.11).

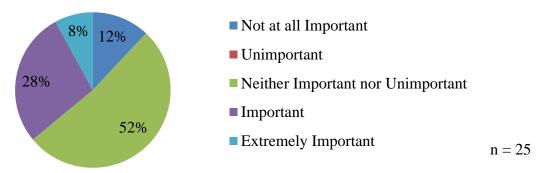


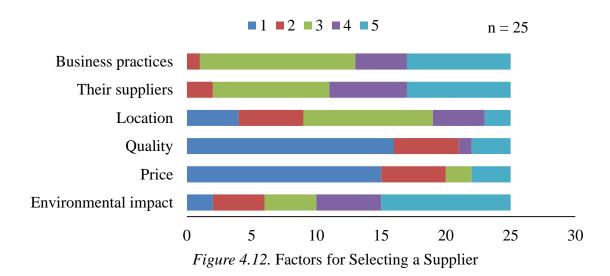
Figure 4.11. Importance of suppliers practicing sustainability

The last question was to find out if their purchasing department was focused on continuously improving their processes. For this the researcher simply questioned about the way products are packaged and shipped over the last two years has changed. A majority of the population (53.85%) said the way products are shipped and packaged had not changed while the remaining 46.15% saw a change. Of the 46.15% of the study population who saw a change, 41.67% replied the change involved bringing in more environmentally friendly materials and to cut cost from the use of virgin materials and extra packaging.

4.5. <u>Supplier Evaluation</u>

To find out how current industry evaluated their suppliers several questions were posed to the population. The first pertained to how the population weighed different

factors commonly associated with the selecting of a supplier (Figure 4.12). The respondents were given the chance to rank each of the factors from 1 (critical to the decision) to 5 (not being critical to the decision process). As the graph shown below illustrates business practices of the supplier ranks very low on the decision process, business practices included employee wages, benefits, working condition, their suppliers, community involvement, etc. The most critical to the decision process were quality and price of the product or service from the supplier. Location of the supplier was next of in line in order of importance. The supplier's environmental impact followed after.



The researcher then surveyed the evaluation difference between foreign and domestic suppliers, as a reminder this study was conducted with all United States organizations therefore foreign suppliers are based outside of the United States. The first question asked how formal or informal the evaluation system was for a foreign and domestic supplier. While 53.84% of the population responded with neither formal or informal for the evaluation of foreign (43.01%) and domestic (10.83%) suppliers. There

was 46.15% of the study population who declared their process to be informal for foreign suppliers while 65% responded with saying their evaluation process was informal for domestic supplier as well.

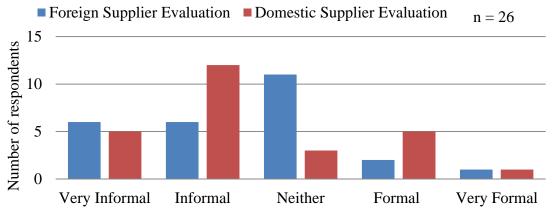


Figure 4.13. Supplier evaluation system

Figure 4.14 shows what the perceived lenience was on foreign suppliers compared to domestic suppliers by the population. While 69% of the population did not conduct environmental audits of their suppliers the remaining population who conducted environmental audits (15%) believed their environmental audits of their foreign suppliers were more lenient than the audit conducted on domestic suppliers, 12% said their audits were the same and the remaining 4% stated their organization was stricter when it came to environmental audits of their foreign suppliers than domestic suppliers. Of those who did participate in environmental audits of their suppliers only 15.38% had seen a change in the way their suppliers were evaluated over the last two years.

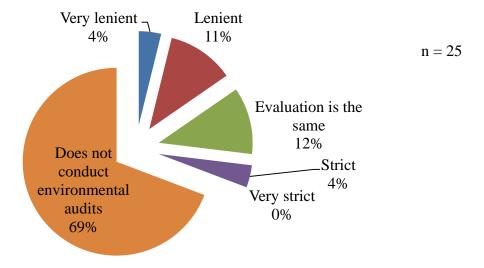


Figure 4.14. Environmental audit evaluation foreign vs domestic

4.6. <u>Section Summary</u>

This section went through each question the researcher asked the population to answer. The responses of the web-based survey were presented graphically and statistically to give the reader an understanding of how the population answered. The next section ties in the main trends of the data and gives understanding to the data presented in this section while the researcher presents reasoning to why the population answered the way they did.

SECTION 5. CONCLUSION

This section is comprised of the outcomes and what was learned from the study. This section took the analysis from section four and tied together the trends to aid in understanding the data and reasoning for the respondents' answers. This section begins by reviewing the questions this study first set off to answer. Then the researcher provides reasoning to how these questions were answered by data. After the researcher has answered the initial questions then recommendations to the PCHP industry and for future research in the area of SPP and sustainability are provided.

5.1. Review: Statement of Problem

As a review, with the furthering separation organizations have with their domestic suppliers and as organizations branch out to find new cost effective ways of managing their supply chain. Organizations must put sustainability practices and theories into place to protect themselves against as many unforeseen threats as possible. With different governments and communities around the world organizations increase their chances of supply disruptions and damage to their brand image. The growing need for organizations to make sure their purchasing department is acting in accordance and has training on SPP is crucial to reduce waste and costs and stay competitive.

The questions answered in this study are: what is the current awareness of U.S. intermediaries in the PHCP manufacturing and distribution industry on SPP with regards to evaluating, selecting and retaining suppliers? Also, to what extent are these practices

are implemented? These questions were formed from personal conversation and an extensive review of literature. This study was done as a cross-sectional exploratory study so further research may be conducted. Organizations need to grasp the true understanding of sustainability to fully reap all the benefits of being sustainable.

5.2. Conclusion

The first question to be answered was what is the current awareness of industry on SPP for choosing their SC members? This study's population was made up of experienced purchasing professionals who had more than five years of experience in a purchasing role and only 17% of the population responded of having a good understanding of SPP, while the remaining population declared of having very bad to zero understanding of SPP. This could in part be due because the population that was researched had more than 20 years of experience in the purchasing profession and when combining the fact the entire population came from private organizations who employed 1-500 employees one could interpret this population as already being set in their ways of conducting themselves in the role. This was confirmed when 62% of the population who's organizations did not provide training believed further training on SPP would not be beneficial. The population has been in the role for so long they may not be concerned with improving the role due in part the way business has been conducted in the past has not failed them. The awareness of the population was also low in part because 90% of the respondents did not receive training from their organization on SPP even though of that 90% there were three respondents who believed in having a good understanding of SPP. Only 10% of the respondents' organizations provided training and of those 10% all of them took the training but only 66% of them declared of having a good understanding of

SPP while the other 33% responded their current understanding was neither good nor bad. Better training techniques need to be developed with a low cost to the organization mind frame so that further training can be provided to small and medium organizations like the ones in this study. This study's population lacked the awareness of what could be achieved if their organizations provided training in SPP.

To test to see if the population may not have been aware of participating in SPP due to lack of knowledge this study asked how the respondents perceived their organizations participated in different activities. At which point the researcher listed out 14 different practices that are considered being in the realm of SPP to see if by chance the population was actively participating but just did not comprehend the practices were SPP. Out of the 14 different practices only four activities stood out from the pack of being actively participated in: volunteers at local charities, donates to philanthropic organizations, ensures that safe, incoming movement of product to their facility, and reduces packaging material. These activities are considered within an organization's control and are relatively straightforward processes to change. As 46% of the population did see a change the way products were being packaged and shipped by becoming more environmentally sound and reducing the amount of virgin material. This was the minority of the population as for the majority was not reaching their potential because there was no noticeable change seen by the majority of the population over the last two years when it came to the way products were packaged and shipped. These straightforward activities (i.e. reducing packaging waste, using recyclable materials, changing how employees are treated, etc.) provide a quick turn around on investment and also show an organization is attributing to becoming more sustainable, but at the same time the organization is not

fully banding together to be truly sustainable. When one sees the fact that the majority of this population did not have training or high awareness of SPP it is not a unimaginable outcome that the population would not be searching more ways to improve their process or product. As the researcher further explains the organizations from this study still have the mindset from the 1970's of mainly looking at the price and quality of the product. The majority of the population have not broadened their concerns with the life cycle of their product or any of the externalities their product causes through the SC.

Every organization is different with different business factors that must be satisfied and their own route to managing their SC and do not have the opportunity with resources to take advantage of the many opportunities afforded to an organization with a sustainable mind set. So after reviewing those findings it is safe to conclude that more training on making an organization's purchasing department more aware is needed if an organization wishes to stay competitive in an ever changing economy and government regulations.

This question also helped in answering to what extent is current industry implementing SPP when retaining, evaluating, and selecting suppliers? This is the second question this study was able to answer. When reviewing the question posed to the population on which of 14 activities they perceived their organization actively participated only four of 14 were selected. This was mostly due to the small size of the organizations in this study; who all employ between 1 and 500 employees. With a low number of resources many purchasing professionals could not invest the time needed with their suppliers to participate in the activities that were listed. As shown in section

two the more time a buyer interacts with their supplier the more sustainability practices and cost savings can be seen.

When questioned about the treatment of the relationship between their organization and their suppliers to find out if there was a solid foundation of trust between the two parties. This solid foundation of trust is essential to the growth of the partnership and to the success of changes. The survey requested the respondent to respond between a range of strongly disagree and strongly agree when it came to the achievements their organization accomplished due to being socially responsible. The population responded of gaining better quality products and achieved a lower lead time. But while at the same time many in the population did not agree or disagree this improvement was due to their supplier becoming more efficient. These changes of better quality and lead times were most likely not brought on due to pressure from a single buying organization but pressure from the supplier's customers as a whole. This determined the buying organizations in the study are more dependent on the supplier than the supplier is on them. This is confirmed when the population was asked if they would provide assistance to their suppliers if needed. The majority of the population believed their organizations would help out their suppliers but in the same turn the majority of the population would not agree or disagree their suppliers would help them. Even with many responding of not believing their suppliers would provide support to them if needed, 53.85% still said they could depend on their suppliers to be there when it was important. The degree of importance is difficult to quantify because there are too many variables that decide what important is and how much support is needed. This study did prove there was a strong trust between the buyer and the supplier because only 7.69% of the

population said that the promises made by their suppliers are considered unreliable. This trust is what creates a strong relationship that allows for a more supportive SC which leads to new innovations and cost savings. This strong relationship was shown as 61.53% of the population did solve supplier problems jointly.

With respect to using this relationship to better their suppliers 56% of the population agreed their organization would not invest in their suppliers to make them more socially responsible which is expected from a medium size firm with low annual revenue (80% of the population brings in fewer than 10 million in annual revenue). So for these SMEs to invest in their suppliers would mean to not invest in themselves which medium firms are unable to do without posing a self-inflected threat. With this threat 20% of the population agreed their organization would make long-term investments in their suppliers. There were five respondents whose organizations brought in between \$100 million to fewer than \$500 million in annual revenue which is substantially more than the rest of the population but even so, not all of them would invest in their suppliers. Three out of five replied of being committed to helping their suppliers achieve a more socially responsible practice which by all means is the majority but not by much. This only strengths the argument that those who have the financial means to invest in their SC members are willing to do so but just need to know how to support them. This foundation of trust but unwillingness to support their suppliers to change to a more sustainable production process shows the dependency the organizations in this study have on their suppliers and not the other way around. An organization's purchasing department can only change their suppliers if the roles were reversed. The only two ways to combat this issue would be to either physically or theoretically prove the cost savings to the upper

management of their suppliers or band together with other customers of the supplier to mandate the necessary changes. While this line of questioning helped attain answers to SPP implementation for retaining suppliers there are still two more parts to the question which are the implementation of evaluating and selecting their suppliers.

To discover how the population evaluated their suppliers the researcher changed the line of questioning to where their supply base was approximately located. This was to identify if domestic suppliers were evaluated different than foreign suppliers. It would be easily assumed that foreign suppliers would have more lenient evaluations, comparatively to regards to the environment, because of the differing government regulations that are put on each individual organization. For the organizations in this study having resource constraints it would be difficult for them to monitor and evaluate everyone the same.

This population supply base had a maximum percentage of where their supply base resided for domestic suppliers at 100% with a minimum of 25%. The maximum for an organization foreign supply base was 75% with a minimum of 0%. The population mean was 79.73% domestically and 20.27% foreign based. Knowing this we are able to detect the different evaluations and how those evaluations play a role into sustainability practices. When it came to how formal the evaluations systems are, 42.31% of the population said their foreign supplier evaluations are neither formal nor informal while 46.15% declared their foreign supplier evaluations to be informal. This again reconfirms that with small to medium organizations it is difficult to monitor and evaluate foreign suppliers. While the majority of the population responded that their domestic suppliers' evaluations were more informal than formal at 65.38% to 23.08%, respectively (the remaining percentage of the population responded neither informal nor formal). This

statistic from the data was difficult to understand how the majority of the population had an informal process to the evaluation of their domestic suppliers. Even with a medium sized organization the majority of the population has been in the field for more than 20 years and many of those years were spent at the same organization the respondents currently were working at the time of this study. It would be imagined that a formal system would have been created in all those years of employment, just to make the evaluation of suppliers simpler for the purchasing professional.

When it comes to monitoring their suppliers on an environmental stand point 69% of the population did not conduct environmental audits of their suppliers which means at least one pillar of sustainability is not be fulfilled. For the remaining population who replied, 28% responded the environmental audit for foreign suppliers was more lenient than for domestic suppliers. This is putting their organizations at great risk for supply disruptions and external attacks on their products by NGOs and even local governments. By not understanding the production process (before, during, and after) of what is going into the products or services a buying organization is purchasing, the organization is leaving a lot to the unknown. This is not a major concern in a way for the small to medium buying organization because there is not a large publicized focus on SMEs like large organizations. SMEs are able to tread softly below suspicion from any external organization or stakeholder. If these SMEs were to participate in environmental auditing it would further their cost savings and risk reduction but with no one able to pressure them to do so, since the supplier is outside the United States, only top management can make the mandate.

Also, an organization cannot expect to monitor their supplier's environmental awareness and benchmarking when the buying organization does not actively participate in such activities, 97% of the population did not participate in environmental auditing in their own organization. This problem is again very common as explained in section two when it comes to organizations with low human resources and lack of competency. Also, with the majority of the population bringing in fewer than \$10 million in annual revenue it would also be unlikely for them to hire an external party to conduct these evaluations.

Now it comes to the last part of the second question which is the implementation of SPP when selecting suppliers. The respondents were asked to grade a list of six factors on how important they were to selecting a supplier. The top two factors were price and quality, which is typical for a purchasing party to nominate as their main factors. This is because these factors are easily attainable and have been the focus in purchasing since the beginning. But an organization with a sustainable mind set would have also ranked environmental impact and business practices a number two or three importance at least. This population ranked the business practices and environmental impact of suppliers as their lowest concerns. This could be contributed to the size of the organizations in this study as well. These two factors would need further in-depth knowledge of their suppliers which would mean an evaluation audit of each supplier would need ot be undertaken before a job was awarded to a particular supplier. The importance of supplier location ranked as a medium concern with this population which is most likely due to the idea for just-in-time modeling and lead times instead of environmental or social impacts created by using local suppliers. The importance of who their suppliers' suppliers are received a low importance ranking as well which could be associated with the lack of transparency

between the buying organization and their suppliers. Also, resource constraint plays another role in this because in-depth knowledge again would need to be gathered with each of their suppliers.

The other question that was asked which had to do with supplier business practices was if it was important for a supplier to practice SPP themselves. 60% replied it was not important. This plays along with the common theme of organizational dependency and market presence. The organizations in this study only had the purchasing power of fewer than \$50 million throughout their entire organization. Without a buying organization to apply pressure toward sustainability, suppliers and organizations alike will not become as efficient and cost effective as a bigger, more financially sound competitors. Another reason this was not a concern for the organization was again they were not highly concerned with monitoring their suppliers. While those who did not monitor their suppliers some still believed it to be an important practice for their suppliers to have.

5.3. Recommendations

As shown both questions for this study were answered. Organizations need to invest in training their employees on how to bring sustainability into their daily decisions. This all starts with upper management placing sustainability issues into their organization's objectives which 72% of the population's organizational objectives did not contain. Without support from top management to change the mindset of the organization, the purchasing department will never become aware of how big of an impact it can make on the bottom line. Interpretation: if a purchasing department is not aware of the impacts and practices then in turn they cannot mandate changes to be made

of their suppliers. Along with asking their suppliers to make changes toward the sustainability horizon the buying organization must be the first to show investment by investing internally to become more sustainable. It is this researcher's recommendation these organizations begin with the low hanging fruit of reducing packaging, placing sustainability into their organization's objectives, setting attainable goals of reducing hazardous waste from their facility and reducing the use of virgin material. As an organization begins the process of moving to a more sustainable horizon the organization needs to continue to improve and use guidelines like ISO 140001 and the GRI to aid their development. The next recommendation is for these organizations to benchmark themselves with the use of this study to show not only internally but externally the improvement year after year. Because this study consisted of all privately owned organizations and without the pressures of the government or shareholders there is no reason to change their ways or their reporting unless it comes from top management. Organizations need to invest in monitoring their suppliers both foreign and domestic but more importantly the need to monitor themselves to at least protect their own facilities from regulative fines and further state and national legislation that will cause a high expense as they will be the last to innovate which is typical of small and medium organizations due to capital constraints. As an industry it would be in their self interest to use ASA as a common discussion point to develop supplier evaluation and monitoring techniques to be shared and implemented industry wide. This would help negate further creation of costly legislation and would only help improve the opportunity for cost savings. The last recommendation to organizations is to begin and progress with small

changes to policy. When small changes are made they are easily attainable and more importantly retainable.

5.4. Future Research

This research should be continued to a larger population size and to be conducted to individual industries. In that way a published journal article like the Supply House Times would act as a greater annual benchmark tool for other organizations in industry. This research could go farther by including both public and privately owned organizations large, medium and small. This would show the shareholder's influence on whether or not organizations change the way they report or do not report. This research could be improved upon if a qualitative section was added to give further insight into why some respondents choose not to answer or a neutral position. The other improvement for this research study would to send the surveys directly to the purchasing professional instead of relaying it through top management even though having the survey emailed out by an organization's top management most likely played a critical role in the high number of respondents. Future research could also analysze the merit of different SPP training courses in regards to retention level and completeness which could lead to the development of new ways of training industry professionals all the while moving towards the sustainability horizon.

5.5. <u>Section Summary</u>

This section answered the two initial questions of the study using the data received by the study's professionals. Those questions were: what the current awareness of the United States plumbing manufacturing and distribution firms on SPP with regards to evaluating, selecting, and retaining suppliers? and to what extent are these practices

being implemented? The researcher then provided recommendations to the study population for becoming more sustainable. Future recommendations were given on what could be improved in this study as well as where someone could pick up where this study left off to create a more inclusive report.

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APPENDIX A

SURVEY

American Supply Association Study

Before beginning the survey please make yourself familiar with these two definitions:

Purchasing – the essential activities associated with the acquisition of materials, services, and equipment used in the operation of an organization.

Sustainable purchasing - an environmentally and ethically conscious purchasing practice which aims to ensure the items purchased meets the environmental and ethical objectives of an organization

This survey will only take 7 to 10 minutes to complete. I would like to thank you for helping complete this study. 0 O • Please click the continue button to begin the survey. Q1. Are you currently working in a purchasing role? O Yes O No Q2. How many years of experience do you have in a purchasing function? O 2 or less years O 3 to 5 years O more than 5 years Q3. How many of those years have been with your current employer? Q4. Is the company you are currently employed under publicly or privately owned? O Publicly owned O Privately owned

Q5. What industry, defined by NAICS, does your company fall into?
O Agriculture, Forestry, Fishing and Hunting
O Mining
O Utilities
O Construction
O Manufacturing
O Wholesale Trade
O Retail Trade
O Transportation and Warehousing
O Information
O Finance and Insurance
O Real Estate and Rent and Lease
O Professional, Scientific, and Technical Services
O Management of Enterprises
O Administrative and Support and Waste Management and Remediation Services
O Education Services
O Health Care and Social Assistance
O Arts, Entertainment, and Recreation
Accommodation and Food ServicesPublic Administration
O Public Administration
Q6. How many employees does your company employ?
O 1-500
O 501-1500
O 1501-5000
O 5,001-9,999
O 10,000 or more

Q7. What is your company's annual revenue in USD?
 under 10 million 10 - under 50 million 50- under 100 million 100 - under 500 million 500 million - under 1 billion over 1 billion
Q8. What is your company's annual purchasing volume in USD?
 under 10 million 10- under 50 million 50 - under 100 million 100 - under 500 million 500 million - under 1 billion over 1 billion
Q9. Does your company participate in environmental auditing?
 Yes, it is completed internally Yes, it is completed by a third party outside of the company No, we do not participate in environmental auditing.
Q10. Approximately where does your supply base reside?
International Domestic
Q11. What do you believe is your current understanding of sustainable (green) purchasing principles?
 Very Bad Bad Neither Good nor Bad Good Very Good

Q12. Does your company incorporate sustainability into its objectives?
O Yes O No
Q13. Does your company provide education on sustainable (green) purchasing? O Yes O No
Q14. Do you believe you would benefit by company sponsored education on sustainable (green) purchasing?
O Yes O No
Q15. Have you participated in your company's education on sustainable (green) purchasing? O Yes O No

Q16.Please rank the following to what extent you believe your organization participates in the following. 1 = to no extent whatsoever, 5= to a great extentCurrently our purchasing function.....

	1	2	3	4	5	I do not know
Uses a Life Cycle Analysis to evaluate the environmental friendliness of products and packaging	0	•	0	•	0	•
Participates in the design of products for disassembly	C	O	O	0	C	O
Asks suppliers to commit to waste reduction goals	O	0	0	0	0	O
Participates in the design of products for recycling or reuse	O	0	O	0	0	O
Reduces packaging material	C	O	C	0	O	O
Purchases from minority/women-owned business enterprise (MWBE)suppliers	•	•	0	•	O	•
Has a formal MWBE supplier purchase program	O	0	O	0	0	O
Visits suppliers' plants to ensure they are not using sweatshop labor	•	O	0	•	O	•
Ensures that suppliers comply with child labor laws	C	O	O	0	O	0
Asks suppliers to pay a "living wage" greater than a country's or region's minimum wage	•	•	0	•	O	•
Volunteers at local charities	O	0	O	0	0	O
Donates to philanthropic organizations	O	O	O	0	O	•
Ensures that suppliers' locations are operated in a safe manner	C	O	C	0	C	•
Ensures that safe, incoming movement of product to our facilities	C	O	O	0	O	0

Q17. Please rank the following with how much you agree or disagree your organization has achieved the following. As a result of undertaking socially responsible activities.....

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
We have been able to obtain products or services from suppliers that are of higher quality	•	O	O	O	O
We have been able to obtain products or services from suppliers with shorter lead times	•	•	0	O	•
Suppliers have done their job more efficiently	O	O	0	•	•
When making important decisions, our suppliers are concerned about our welfare	•	•	O	•	O
When it comes to things that are important to us, we can depend on our suppliers' support	•	O	O	O	O
Promises made by suppliers are reliable	0	O	•	•	O
Our company helps out suppliers in whatever ways they ask	•	O	O	O	O
Any problems that may arise with suppliers are solved jointly	O	O	O	•	0

Q18. The relationships our organization has with our suppliers for our socially responsible initiatives....

\mathbf{O}	Are somet	hing we	are very	/ committed	to
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- Are something we intend to maintain indefinitely
- Are something we are willing to make long-term investments in
- Are something we are not committed to

Q19. To what extent is your company's supplier evaluation system formal?

	Very Informal	Informal	Neither	Formal	Very Formal
Foreign Supplier Evaluation	O	O	O	•	0
Domestic Supplier Evaluation	•	0	0	0	0

Q20. In your opinion, how does evaluation of your organization's foreign suppliers compare to your domestic suppliers, when it comes environmental auditing?
 Very lenient Lenient Evaluation is the same Strict Very strict My current organization does not conduct environmental audits of our suppliers
Q21. Have you seen a change in foreign supplier evaluation practices over the last two years?
O Yes O No
Q22. Have you seen a change in the way products are packaged or shipped in the last two years? O Yes O No
Q23. Please explain the change you noticed in the way products are packaged in short detail.

Q24. Please grade the following in matters of importance when selecting a supplier. (1 = Critical, 5 = Not very important)

	1	2	3	4	5
Environmental impact	0	0	0	•	O
Price	0	0	0	0	0
Quality	0	0	0	0	0
Location	0	0	0	0	0
Their suppliers	0	0	0	0	0
Business practices (employee wages, benefits, working condition, their suppliers, community involvement, etc)	0	•	O	O	0

Q25.	How im	iportant c	loes your	organization	believe	it is for	your su	opliers to	practice
susta	inable p	ourchasing	g?						

- O Not at all Important
- **O** Unimportant
- O Neither Important nor Unimportant
- **O** Important
- **O** Extremely Important

APPENDIX B

REQUIRED AUTHORIZATION AND ENDORSEMENTS

Dr. Palisi

I have no problem with this, with the usual credit lines.

All good wishes for success in your important work.

Marianne M. Jennings
Professor of Legal and Ethical Studies
W.P. Carey School of Business
Arizona State University
Tempe, AZ 85287-4006
480-727-6655
FAX 480-965-8314
marianne.jennings@asu.edu

From: Francis X Palisi Jr [mailto:fpalisi@purdue.edu]

Sent: Mon 11/21/2011 12:12 PM

To: ccarter@rhsmith.umd.edu; Marianne Jennings Cc: kanewton@purdue.edu; Edward Sweeney

Subject: Permission to use your survey in my study

Good evening Dr. Carter and Dr. Jennings,

My name is Frank Palisi. I am currently a graduate student at Purdue University and Dublin Institute of Technology working towards a dual Master of Science in Supply Chain Management and Sustainability.

I am emailing you to ask for your permission to use the survey from your 2002 article 'Social responsibility and supply chain relationships' in my research study. I am currently trying to show the relationship between a purchasing department's education on sustainable purchasing practices and the degree of implementation of sustainable purchasing practices. I believe your survey would be perfect to evaluate how well an organization has implemented sustainable purchasing practices. Please let me know if you have any questions or concerns pertaining to my research. I have cc'd my leading advisers on this email as well.

Dr. Kathryne A. Newton Professor, Industrial Distribution Department of Technology, Leadership and Innovation Purdue University Knoy Hall of Technology

Dr. Edward Sweeney
Director of Learning
National Institute for Transport and Logistics
College of Engineering and Built Environment
DIT Bolton Street Campus

Regards, Frank Palisi fpalisi@purdue.edu Purdue University

APPENDIX C

SOLICITATION TO SURVEYED PARTICIPANTS

Subject: IMPORTANT ASA sponsored study on purchasing practices Good Morning,

My name is Frank Palisi. I am in the Master of Science Industrial Distribution program at Purdue University and need your assistance. I am currently working on a research study with Dr. Kathryne Newton, on the extent organizations participate in sustainable purchasing practices (SPP) in the United States PHCP and PVF industry. This project is being sponsored by the American Supply Association and we expect the results to be published in Supply House Times. Dr. Newton will also use the results to help better inform future attendees at the University of Industrial Distribution and to better educate Purdue University students.

If you are willing to help, please take the time to send this email to the appropriate purchasing/procurement personnel and/or see if you are able to answer the questions as well about your organization. The survey is 25 questions and takes only 7 -10 minutes to complete. Anyone can fill out the online survey by clicking on the link below:

ENTER LINK HERE

When results of the survey are collected, all identifying information will be removed, and there will be no way to trace responses back to specific respondents or organizations. Thank you in advance for your help in completing my thesis for my degree, and for advancing the distribution industry. It is greatly appreciated. The study will primarily evaluate the current awareness and implementation of sustainable purchasing practices. The second hope of the study will look to see how many organizations actively train their employees on SPP.

Best Regards,

Frank Palisi

M.S. candidate Purdue University and M.Sc. candidate Dublin Institute of Technology 0